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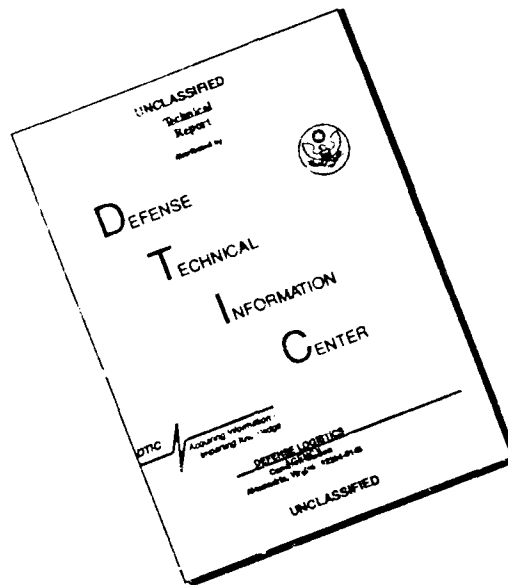
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THIRD QUARTER 1986

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The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

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PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

AFOSR MISSION

The Air Force Office of Scientific Research (AFOSR) is the Single Manager of the Air Force Defense Research Sciences Program (Program Element 611C2F) and the primary Air Force agency for the extramural support of fundamental scientific research. The AFOSR is organizationally under the DCS/Science and Technology, Air Force Systems Command.

AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from unsolicited proposals originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

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DTIC Report Bibliography - DTIC's brief description of a technical report.

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AD Number - A number assigned to each technical report when received by the DTIC.

Field & Group Numbers - (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

Corporate Author/Performing Organization - The organization; e.g., college/university, company, etc., at which the research is conducted.

Title - The title of the technical report.

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Date - Date of the technical report.

Pages - Total number of pages contained in the technical report.

Personal Author - Person or persons who wrote the report.

Contract/Grant Number - The instrument control number identifying the contracting activity and funding year under which the research is initiated.

Project Number - A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

Task Number - An alphanumeric number unique to a specific field of the main area of science; e.g., 2304 is the project number for mathematics and A3 is the task number for computational sciences.

Monitor Number - The number assigned to a particular report by the government agency monitoring the research. The number consists of the government monitor acronym, the present calendar year and the technical report assigned consecutively; e.g., AFOSR-TR-83-0001 is the first number used for the first technical report processed for Calendar Year 1983.

Supplementary Note - A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article appears in, and the volume number, date, and the page numbers of the journal.

Abstract - A brief summary describing the research of the report.

Descriptors - Key words describing the research.

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AD-A168 861

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ABSTRACTS

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 DTIC REPORT BIBLIOGRAPHY SE RCH CONTROL NO. EVN34M
 AD-B102 441L CONTINUED

(U) Micro Mechanisms of Deformation in SiC/Al Composites.

DESCRIPTIVE TITLE: Interim rept. 1 Aug 84-31 Jul 85.

AUG 85 42P

PERSONAL AUTHOR: Papazian, J. M., Adler, P. N. ;

REPORT NO. RE-703

CONTRACT NO F49620-84-C-0055

PROJECT NO 2306

TASK NO. 21

MONITOR: 36-0288

UNCLASSIFIED REPORT
 EXPORT CONTROL

Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; 30 Apr 86. Other requests must be referred to Air Force Office of Scientific Research, Attn: XOTD, Building 410, Bolling AFB, DC 20332. This document contains report-controlled technical data.

ABSTRACT: (U) The micro-mechanisms of deformation of aluminum matrix composites containing SiC particles or whiskers are being evaluated in order to discover ways to improve their mechanical properties. A particular aspect of the examination of these material that is being critically examined is the interaction between internal SiC precipitates formed by conventional age hardening practice. The first year's work has been occupied with obtaining materials, designing appropriate specimens and quantifying the effects of SiC on precipitation of the age hardening phases. Ten composite billets were purchased and extruded, they include 2124 and 8450 matrix alloys, and various volume fractions of SiC particulate and whiskers. The effects of SiC on precipitation in 2124 were evaluated in a variety of conditions where quenching rate, aging practice, and SiC content are the primary variables. The precipitation sequence in the composites was found to be very similar

to that of SiC free material. Additionally, the sequences were similar in SiC free 2124 prepared either by powder metallurgy, PM, or by ingot metallurgy. The quench sensitivity of 2124 was affected by the presence of SiC. Both SiC particulate and whiskers increased the quench sensitivity of 2124 somewhat, mainly by causing the precipitation of GPB zones and S' during the quench. The most pronounced effect of SiC was found to be a decrease in the volume fraction of GPB zones formed.

DESCRIPTORS: (U) *AGE HARDENING, *DEFORMATION, *METAL MATRIX COMPOSITES, *SILICON CARBIDES, AGING(MATERIALS), ALLOYS, ALUMINUM, BILLETS, CASTINGS, FRACTURE(MECHANICS), MATERIALS, MATRIX MATERIALS, MECHANICAL PROPERTIES, METALLURGY, PARTICLES, PHASE, POWDER METALLURGY, PRECIPITATION, QUENCHING, RATES, SEQUENCES, ALUMINUM ALLOYS, BILLETS(MATERIALS), WHISKER COMPOSITES, STRENGTH(MECHANICS), INTERMETALLIC COMPOUNDS

IDENTIFIERS: (U) Aluminum alloy 2124, Aluminum alloy 8450, EXPORT CONTROL, PE61102F, WUAFDSR2306A1

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DYIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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CALIFORNIA UNIV LOS ANGELES

NEW YORK UNIV N Y

(U) Measurement and Modification of Sensorimotor System Function During Visual-Motor Performance

(U) The Perception of the Higher Derivatives of Visual Motion.

DESCRIPTIVE NOTE: Annual rept. 30 Sep 84-29 Sep 85.

DESCRIPTIVE NOTE: Final scientific rept. 1 Jan 82-31 Sep 85.

JUN 80 30P

JUN 80 85P

PERSONAL AUTHOR(S): Sterman, M. B.; Duchenko, T.; Hamel, A. S.

PERSONAL AUTHORS: Kaufman, Lloyd; Williamson, Samuel J.;

CONTRACT NO. AFOSR-82-0338

CONTRACT NO. AFOSR-82-0080

PROJECT NO. 2313

PROJECT NO. 2313

TASK NO. A4

TASK NO. A5

MONITOR: AFOSR
TR 82-0556

MONITOR: AFOSR
TR-88-0815

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives addressed during this phase of our work may be summarized as follows: 1) Complete initial study of sensorimotor and visual cortical EEG correlates of performance in an extended flight simulation task using band-pass analysis. Focus on intrinsic and imposed biological periodicities in these data; 2) Initial second, more comprehensive study to provide greater resolution of EEG-performance correlates using power spectral analysis. Focus on problems of situational fusion and fatigue; and 3) Establish program at Edwards Air Force Base for in-flight testing of EEG recording techniques. Collect data for evaluation of EEG characteristics in relation to the dimensions of vigilance and induced changes in consciousness.

ABSTRACT: (U) Sensitivity to changing speed was studied with gratings of various spatial frequencies drifting across a screen while the average velocity was modulated. Thresholds expressed either as the velocity amplitude (difference between peak and average velocities) or as the maximum acceleration, increased monotonically with average velocity. The threshold for velocity contrast (velocity amplitude divided by average velocity) actually decreased with average velocity. The velocity contrast was minimal for velocity modulation frequencies of about 2 Hz and for spatial frequencies in the range of 2-4.5 c/d. In addition to these basic findings, we failed to find any effect of selective adaptation to changing speed other than that could be attributed to smooth motion. It seems unlikely that mechanisms tuned to respond to changing speed per se are present in the human perceptual system. However, it is not possible to generalize from this to situations where higher derivatives are introduced by causing stimuli to change direction of motion. (Author)

DESCRIPTORS: (U) *ELECTROENCEPHALOGRAPHY, *MOTOR REACTIONS, *NEUROPHYSIOLOGY, FLIGHT SIMULATION, VISUAL ACUITY, STRESS (PHYSIOLOGY), VIGILANCE, PASSENGERS, CONSCIOUSNESS, PILOTS, INFLIGHT, FATIGUE (PHYSIOLOGY), LIFE CYCLES, CEREBRAL CORTEX, WORKLOAD

IDENTIFIERS: (U) T-38 aircraft, PE81102F, WUAFOSR2313A4

DESCRIPTORS: (U) *VISUAL PERCEPTION, *COMPUTER OPERATORS, *VELOCITY, MOTION, SENSITIVITY, ACCELERATION, AMPLITUDE MODULATION, CHARTS

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SEARCH CONTROL NO. EVN34M

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IDENTIFIERS. (U) Visual Motion, PE81102F, WUAFOSR2313A5

PITTSBURGH UNIV PA DEPT OF CHEMISTRY

(U) Spectroscopic Studies of the Products of the Reactions of Electronically Excited Atoms and Small Molecules.

DESCRIPTIVE NOTE: Final rept. 15 Apr 83-14 Apr 88.

JUN 88 33P

PERSONAL AUTHORS: Golde, Michael F. ;

CONTRACT NO. AFOSR-83-0188

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-0534

UNCLASSIFIED REPORT

ABSTRACT: (U) The rate constants and products of the reactions of electronically excited Ar, Kr, and Xe atoms and N₂(A 3 Sigma⁺) sub u) and CO(a 3 Pi) molecules with several oxygen, hydrogen and chlorine containing compounds have been determined, using emission spectroscopy, atomic resonance fluorescence and laser induced fluorescence measurements in discharge flow systems. As found previously for the excited noble gases, there is a strong correlation between the rate constants for quenching of N₂(A) and the availability of accessible acceptor states of the quenching molecule, as revealed by its absorption spectrum. Consistent with this correlation, the rate constants for several inefficient quenchers are greatly enhanced reactions with vibrationally-excited N₂(A). Energy transfer leading to molecular dissociation is the dominant mechanism, when energetically allowed, for most reactions of N₂(A) studied. Similar behavior is shown by both efficient and inefficient quenchers, and the results parallel the UV photochemistry of these molecules. In contrast to N₂(A), the isoelectronic CO(a 3 Pi) species is quenched very efficiently by H₂O, CH₄ and H₂. The reaction products have been investigated in an attempt to gain insight into this difference in behavior.

DESCRIPTORS: (U) *LASER INDUCED FLUORESCENCE, *RESONANCE RADIATION, *REACTION KINETICS, RARE GASES, NITROGEN,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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EXCITATION, ENERGY TRANSFER, GAS DISCHARGES, EMISSION
SPECTROSCOPY, CO (INHIBITION), MOLECULAR VIBRATION,
NITROGEN, WATER, CARBON DIOXIDE, METHANE, HYDROGEN

IDENTIFIERS: (U) PB81102F, WJAFDSR230301

AD-A17, 029 17/10

COOPERATIVE INST FOR RESEARCH IN ENVIRONMENTAL SCIENCE
BOULDER CO

(U) Deterministic Methods of Seismic Source Identification.

DESCRIPTIVE NOTE: Annual technical rept. 30 Sep 83-1 Oct
84.

NOV 84 144P

PERSONAL AUTHORS: Archambeau, Charles B. ;

CONTRACT NO. F49620-83-C-0008, ARPA Order-4889

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-88-0506

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives were to: (1) Develop and test methods of discrimination in the regional and teleseismic distance range using physical source parameter discriminants. Pursue theoretical and observational studies of seismic sources; (3) develop methods of theoretical seismogram synthesis in the near, regional and teleseismic distance ranges for structure and source definition; (4) Develop and apply advanced signal processing/analysis methods for discrimination and explosion yields estimation studies and; (5) Pursue near field studies of explosions and earthquakes for detailed source definition. This report describes specific research results pertaining to: (1) The theoretical basis for automatic seismic signal detection and analysis, and (2) Analytical methods for the representation of seismic radiation fields in uniformly layered elastic/anelastic media. This modal method provides predictions of both body and surface waves in the frequency range from 0 to about 15 Hz at near and regional distances from seismic sources. This latter exposition is intended to be comprehensive and integrates new and old results and methods. The modal representation method for seismic radiation fields is being employed to describe radiation fields for the prediction of earthquake and explosion radiation fields and has been used to evaluate a variety

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of detection and discrimination methods.

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED
MATHEMATICS AND STATISTICS

DESCRIPTORS: (U) *DISCRIMINATION, *SEISMIC SIGNATURES,
UNDERGROUND EARTHQUAKES, SEISMOLOGY, SEISMIC
DETECTION, *RIER ANALYSIS, TIME SERIES ANALYSIS

(U) On the Maintenance of Systems Composed of Highly
Reliable Components.

IDENTIFIERS: (U) Seismic discrimination,
QED(Quadrant Decomposition), WUAF05R2309A2, PE01102F

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85.

SEP 85 18P

PERSONAL AUTHORS: Katakakis, Michael N.; Derman, Cyrus ;

REPORT NO. AMS-85-57

CONTRACT NO. AFOSR-84-0130, NSF-DMS84-05413

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0520

UNCLASSIFIED REPORT

ABSTRACT: (U) We consider the dynamic repair allocation
problem for a general multi-component system that is
maintained by a limited number of repairmen. Component
functioning and repair times are assumed to be
exponentially distributed with parameters that may depend
on the component but not on repairmen. At most one
repairman may be assigned to a failed component. The
objective is to determine repair allocation policies that
maximize a measure of performance for the system such as
the expected discounted system operation time or the
availability of the system. We consider systems composed
of highly reliable i.e., small failure rates, components
and study asymptotic techniques for the determination of
optimal policies. In the final section we find
asymptotically optimal policies for the series, parallel
and a system composed of parallel subsystems connected in
series. (Author)

DESCRIPTORS: (U) *MAINTENANCE, *SYSTEMS MANAGEMENT,
*APPLIED MATHEMATICS, REPAIR, ASYMPTOTIC NORMALITY,
OPTIMIZATION, RELIABILITY, DYNAMIC PROGRAMMING

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AD-A171 002 14/2 20/2

TEXAS A M UNIV COLLEGE STATION

MINNESOTA UNIV ST PAUL

(U) On Nonlinearities in Asymptotic Memoryless Detection.

(U) Variable Temperature Superconducting Magnetometer/Susceptometer.

MAR 86 6P

MAR 86 12P

PERSONAL AUTHOR: Halverson, Don R.; Wise, Gary L.

PERSONAL AUTHORS: Dahlberg, E. D.; Muenck, Eckard; Goldman, Allen M.; Weymann, Walter.

CONTRACT NO. AFOSR 82-0033, AFOSR-81-0047

PROJECT NO. 2304

CONTRACT NO. AFOSR-85-0047

MONITOR: AFOSR

PROJECT NO. 2917

TR-86-0437

TASK NO. A3

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-86-0528

SUPPLEMENT: NOTE: Pub in IEEE Transactions on Information Theory, VIT-32 n2 p292-298 Mar 86

UNCLASSIFIED REPORT

ABSTRACT: (U) The discrete time detection of a constant signal in a noisy environment is considered. First the case where the noise is independent and identically distributed is considered, and the criterion of relative efficiency is employed to investigate the detector's performance. Induced by altering the form of the detector nonlinearity from that of the locally optimal nonlinearity, the results show that the resultant degradation in performance can be bounded. As the L2 distance between the locally optimal nonlinearity of interest, we then extend our results to the case of weakly dependent phi-mixing noise and see that in particular, asymptotic relative efficiency can be viewed as a mapping between metric spaces that is continuous at the point of interest.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *NOISE REDUCTION, *EFFICIENCY, *ASYMPTOTIC NORMALITY, DISCRETE DISTRIBUTION, DETECTORS, *THEOREM

IDENTIFIERS: (U) *Memoryless detection, Neyman Pearson Decision Theory, PEB1102F, WUAFOSR2304A5

ABSTRACT: (U) A variable temperature superconducting susceptometer has been acquired for the measurement of magnetic moments and susceptibilities of small samples over a wide range of temperature and magnetic field. This instrument is equipped for measurement over the temperature range from 1.8K up to 400K, and in magnetic fields up to 8 Tesla. The system operates under full computer control of all of its parameters utilizing a software package which runs on a Hewlett Packard Touch Screen II Computer. The instrument will be shortly retrofitted with a second SQUID Probe configured to permit measurements of components of the magnetization and susceptibility transverse to the axis of the instrument as well as to rotate samples about the axis of the superconducting solenoid.

DESCRIPTORS: (U) *MAGNETOMETERS, *ELECTROMAGNETIC SUSCEPTIBILITY, *SUPERCONDUCTORS, MAGNETIC MOMENTS, MAGNETIC FIELDS, TEMPERATURE COEFFICIENTS, QUANTUM ELECTRONICS, RESEARCH MANAGEMENT, COMPUTER APPLICATIONS, CONTROL SYSTEMS

IDENTIFIERS: (U) SQUID(Superconducting Quantum Interference Devices), PEB1102F, WUAFOSR2917A3

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AF-86-002

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 844 20/8

COLOR UNIV AT BOULDER

(U) Laser Diagnostics for Plasma Turbulence Research.

DESCRIPTIVE NOTE: Final rept 1 Jan-31 Dec 85.

MAR 85 4P

PERSONAL AUTHORS: Robertson, Scott ; Stern, Raul ;

CONTRACT NO. AFOSR-85-0089

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-88-0428

UNCLASSIFIED REPORT

ABSTRACT (U) A tunable scanning dye laser pumped by an argon ion laser (Coherent Models 688-21 and INNOVA-12UV, respectively) has been installed for use as a diagnostic in experiments on ion beams and plasma turbulence. The laser passed acceptance tests in October 1985. Initial use is in a new experiment to determine the atomic processes in negative hydrogen ion sources. This project, entitled Modern Diagnostics of Negative Hydrogen Plasmas, is supported by a NATO grant. (Author)

DESCRIPTORS: (U) *TUNABLE LASERS, *DYE LAYERS, *PLASMA DIAGNOSTICS, ARGON LASER, LASER PUMPING, ION BEAMS, TURBULENCE

IDENTIFIERS: (U) PE61102F, WJAFOSR2301A7

AD-A170 978 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Polysilane High Polymers with Olefinic Side Groups: Syntheses, Properties, and Addition of Hydrogen Halides.

DEC 85 5P

PERSONAL AUTHORS: Stueger, Harold ; West, Robert ;

CONTRACT NO. F49620-83-C-0044

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-0589

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Macromolecules, v18 n12 p2349-2352 Dec 85.

ABSTRACT: (U) Three polysilane polymers containing alkene substituent groups were prepared by sodium condensation dichlorosilanes: poly((2-(3-cyclohexenyl) ethyl)methylsilylene) (3) and copolymers of this with phenylethylsilylene (1) and n-propylethylsilylene units (2). These polymers undergo cross-linking when irradiated with UV light or heated to 200 C in vacuo. Addition of HCl or HBr to 1 or 2 in the presence of Lewis acid catalysts gave the corresponding chlorine- or bromine-containing polymers, with little degradation of the polysilane backbone.

DESCRIPTORS: (U) *SILANES, *POLYMERS, *SYNTHESIS(CHEMISTRY), *ADDITION REACTIONS, SODIUM CONDENSATION, CHLOROSILANES, CROSSLINKING(CHEMISTRY), HYDROGEN CHLORIDE, HYDROGEN COMPOUNDS, BROMIDES, ULTRAVIOLET RADIATION, MACROMOLECULES, REPRINTS

IDENTIFIERS: (U) WJAFOSR2303B2, PE61102F

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WISCONSIN UNIV MADISON DEPT OF CHEMISTRY
DITIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M
AD-A170 872 CONTINUED
WUAFOSR2303B2, PEG1102F

(U) IR Transition Moment Directions in Matrix-Isolated
Dimethylsilylene and 1-Methylsilene.

88 9P

PERSONAL AUTHOR: Riabe, Gerhard ; Vancik, H. ; West, Robert ;
Michl, Josef

CONTRACT NO. W49620-83-C-0044

PROJECT NO. 203

TASK NO. 82

MONITOR: AFC
TR 0586

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of The American Chemical
Society, Vol. 104, p871-877, 1988.

ABSTRACT: (U) Irradiation of matrix-isolated dimethyldiazasilane yields dimethylsilylene(1) as the major product. Photoselection on the 450 nm absorption band of 1 with polarized 488-nm light, which converts 1 into 1-methylsilene(2), permitted the assignment of six IR transitions of 1 and twelve IR transitions of 2 as in-plane or out-of-plane polarized. Photoselection on the 260-nm absorption band of 2 with polarized 248-nm light, which converted 2 back into 1 allowed a determination of the absolute values of polarization angles of seven in-plane polarized IR transitions of 2 relative to the plane of polarization of the incident light. The resulting map of the IR transition moment directions in the molecule of 1 provides strong support for a detailed assignment of the nature of the vibrational motions involved. Along with other data, the results lead to very little doubt as to the correctness of the structural and vibrational assignments in 1 and 2.

DESCRIPTORS: SILANES, METHYL RADICALS,
PHOTOCHEMICAL REACTIONS, IRRADIATION, ELECTRON
TRANSITIONS, ABSORPTION SPECTRA, POLARIZATION, VIBRATION,
MOMENTS, MOLECULAR STRUCTURE, DICHOISM, REPRINTS

IDENTIFIERS: Silylene/Dimethyl, Silene(1 Methyl).

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 971 20/12 20/3

BROWN UNIV. PROVIDENCE RI DIV OF ENGINEERING

(U) Picosecond Nonlinear Resonant Interactions in Semiconductors.

DESCRIPTIVE NOTE: Interim rept. no. 1 (Annual), 1 Jan-31 Dec 82.

MAR 86 13P

PERSONAL AUTHORS: Nurmikko, Arto V. ;

PROJECT NO. 2308

TASK NO. C2

MONITOR: AFOSR
TR-88-0528

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultrashort pulses of laser radiation in order to study coupled electronic and magnetic excitations under selected nonequilibrium conditions. We hoped to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g. we measured the formation of local, microscopic magnetically oriented 'domains' through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) *SEMICONDUCTORS, *MAGNETIC MATERIALS, *BAND THEORY OF SOLIDS, *MAGNETIC DOMAINS, CADMIUM COMPOUNDS, *MANGANESE COMPOUNDS, SELENIDES, TELLURIDES, EXCITONS, TEMPERATURE, SPECTROSCOPY, PHOTONS

IDENTIFIERS: (U) Magnetic excitations, BMP(Bound Magnetic Polaron), Cadmium manganese selenide, Cadmium manganese telluride, WUAFOSR22306C2, PE81102F

AD-A170 971

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AD-A170 970 20/12 20/3 20/5

MICHIGAN UNIV ANN ARBOR COASTAL ZONE LAB

(U) Picosecond Nonlinear Resonant Interactions in Semiconductors.

DESCRIPTIVE NOTE: Interim rept. no. 2 (Annual) 1 Jan-31 Dec 83.

MAR 86 13P

PERSONAL AUTHORS: Nurmikko, Arto V. ;

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2308

TASK NO. C2

MONITOR: AFOSR
TR-88-0524

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultrashort pulses of laser radiation in order to study coupled electronic and magnetic excitations under selected nonequilibrium conditions. We hope to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g. we measured the formation of local, microscopic magnetically oriented 'domains' through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) *SEMICONDUCTORS, *MAGNETIC DOMAINS, *GROUP II-VI COMPOUNDS, *PULSED LASERS, *MAGNETIC RESONANCE, CADMIUM COMPOUNDS, *MANGANESE COMPOUNDS, NONLINEAR SYSTEMS, SELENIDES, TELLURIDES, LIGHT PULSES, SPECTROSCOPY, MAGNETOPTICS, IONS, COUPLING(INTERACTION), REAL TIME, EXCITONS

IDENTIFIERS: (U) Resonant Interactions, Cadmium manganese selenide, Cadmium manganese telluride, Magnetic excitations, T-2 relaxation time, BMP(Bound Magnetic

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO EVN34M

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AD-A170 944 12/1

Polarons). Genetic polarons, Polarons. WUAFOSR2308C2,
PE81102F

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC
PROCESSES

(U) Semigroups and Poisson - Approximation.

DESCRIPTIVE NOTE: Technical rept. no. 132, Sep 85-Aug 86.

DEC 85 13P

PERSONAL AUTHORS: Deheuvels, P.; Pfeifer, D. ;

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0339

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) This paper extends previous work of the authors on Poisson approximation for (general) independent Bernoulli summands with respect to the total variation distance, without imposing any conditions on the underlying parameters. This enables one to study also the case of unbounded means, without asymptotic uniform smallness of the individual summands, provided that the variance increases with the same rate as the mean. An important practical situation in which such an asymptotic behaviour occurs is described by Ross's Markov chain model for the Simplex Algorithm in linear programming, which will be discussed as an example of possible application. (Author)

DESCRIPTORS: (U) *GROUPS(MATHEMATICS),
*APPROXIMATION(MATHEMATICS), RANDOM VARIABLES, ALGORITHMS,
ASYMPTOTIC NORMALITY, LINEAR PROGRAMMING, STOCHASTIC
PROCESSES

IDENTIFIERS: (U) *Semigroups(Mathematics), Simplex
Method, PE81102F, WUAFOSR2304A5

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AD-A170 935 14/2 9/2

DREXEL UNIVERSITY PHILADELPHIA PA DEPT OF ELECTRICAL AND
COMPUTER ENGINEERING(U) Computer Facilities for High-Speed Data Acquisition,
Signal Processing and Large Scale System Simulation

DESCRIPTIVE NOTE: Final rept. 15 Dec 84-14 Apr 86

JUN 86 28P

PERSONAL AUTHORS: Bilgutay, Nihat M. ;

CONTRACT NO. AFOSR-85-0058

PROJECT NO. 2917

TASK NO. 23

MONITOR: AFOSR
TR-86-0507

UNCLASSIFIED REPORT

ABSTRACT: (U) This equipment grant was issued under the DOD University Research Instrumentation Program for the purpose of upgrading the research instrumentation at Drexel University, Electrical and Computer Engineering Department in order to improve the existing facilities to better support present and future research having relevance to the National Defense Goals. In accordance with the guidelines of the grant, the funds have been expended to fulfill the stated goals of the grant.

DESCRIPTORS: (U) *MILITARY RESEARCH; *INSTRUMENTATION, *DIGITAL COMPUTERS, GRANTS, RESEARCH FACILITIES, ELECTRICAL ENGINEERING, COMMUNICATIONS NETWORKS

IDENTIFIERS: (U) Funding, VAX 11/780 computers, Ethernet, WUAFOSR251743, PE01102F

AD-A170 935

UNCLASSIFIED

AD-A170 923 7/4

BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY

(U) Compounds Containing Heteronuclear Metal-Metal Bonds.

DESCRIPTIVE NOTE: Final rept. 1 Mar 82-28 Feb 86.

MAR 86 24P

PERSONAL AUTHORS: Stone, F. G. ;

CONTRACT NO. AFOSR-82-0070

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR
TR-80-0510

UNCLASSIFIED REPORT

ABSTRACT: (U) This Report describes the synthesis and structural characterization of several gold-ruthenium cluster compounds, as well as the discovery of the first trimetallic complexes containing the hexanuclear core structures MM'Ru4 (M = Ag, M' = Cu; M = Au, M' = Cu; M = Au, M' = Ag). Using variable temperature 31P-NMR nuclear magnetic resonance spectroscopy we have observed polytopal rearrangements of these clusters in solution. Also described are new heteronuclear cluster compounds containing bonds between iridium and osmium or platinum. In a further study the first mixed-metal clusters involving osmium and platinum with interstitial carbido ligands are reported. Rational synthetic routes have been developed for preparing cluster compounds containing chains and rings of metal atoms in which the metal-metal bonds are bridged by alkylidyne groups. This work has led to the characterization, via X-ray diffraction and n.m.r. studies, of novel compounds with core structures having eight metal atoms (Pt4W4 or Ni2Pt2W4) in a ring in the shape of a 'star'.

DESCRIPTORS: (U) *SYNTHESIS(CHEMISTRY), *ANALYTICAL CHEMISTRY, *METAL COMPLEXES, *METAL METAL BONDS, HETEROCYCLIC COMPOUNDS, GOLD, RUTHENIUM, CLUSTERING, TERNARY COMPOUNDS, NUCLEAR MAGNETIC RESONANCE, SPECTROSCOPY, CHEMICAL BONDS, IRIIDIUM, OSMIUM, PLATINUM, POLYCYCLIC COMPOUNDS, MOLECULAR STRUCTURE, LIGANDS

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 923 CONTINUED

AD-A170 915 9/2

DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

IDENTIFIERS: (U) PEB1102F, WUAFOSR2302B2

(U) A Single Server Queue in a Hard-Real-Time Environment.

DEC 85 9P

PERSONAL AUTHORS: Baccelli, Francois ; Trivedi, Kishor S. ;

CONTRACT NO. AFOSR-84-0132, NSF-WCS83-0200

PROJECT NO. 2304

TASK NO. K3

MONITOR: AFOSR
TR-88-0594

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Operations Research Letters,
v4 n4 p161-168 Dec 85.

ABSTRACT: (U) We consider a single server first in first out queue in which each arriving task has to be completed within a certain period of time (its deadline). More precisely, each arriving task has its own deadline - a non-negative real number - and as soon as the response time of one task exceeds its deadline, the whole system is considered to have failed. (In that sense the deadline is hard). The main practical motivation for analyzing such queues comes from the need to evaluate mathematically the reliability of computer systems working with real time constraints (space or aircraft systems for instance). We shall therefore be mainly concerned with the analytical characterization of the transient behavior of such a queue in order to determine the probability of meeting all hard deadlines during a finite period of time (the 'mission time'). The probabilistic methods for analyzing such systems are suggested by earlier work on impatience in telecommunications systems. (Author)

DESCRIPTORS: (U) *QUEUEING THEORY, *DOWNTIME, REAL TIME, MATHEMATICAL MODELS, NUMERICAL ANALYSIS, SYSTEMS ANALYSIS, REPRINTS

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304K3

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 905 20/7 10/2

CORNELL UNIV. ITHACA NY LAB OF PLASMA STUDIES

(U) Interim Scientific Report for the Induction Linac Program

DESCRIPTIVE NOTE: Annual rept. 1 Oct 83-30 Sep 84.

SEP 84 23P

PERSONAL AUTHOR: Nation, John A. ;

CONTRACT NO. AFOSR-83-0384

PROJECT NO. 2301

1. C NO. A7

MONITOR: AF R
TR 88-0548

UNCLASSIFIED REPORT

ABSTRACT: (U) The Induction Linac program has been carried out principally using a dedicated Blumlein facility as the pulse power source. As previously described the source feeds a two to one step up autotransformer, which when coupled with a direct electrostatic feed to the anode from the Blumlein, gives a diode voltage of three times the line output voltage. The nominal operating impedance of the system is 21 Ohms. This system has continued to work well during the current grant period (Author)

DESCRIPTORS: (U) *LINEAR ACCELERATORS, *PROTON ACCELERATORS, *PULSE GENERATORS, POWER SUPPLIES, ELECTRICAL IMPEDANCE, PROTON BEAMS, TRANSIENTS, FERRITES, INDUCTANCE, DIODES, WAVIFORMS

IDENTIFIERS: (U) Blumlein facilities, Autotransformers, Ferrite cores, Beam diagnostics, Injectors, Faraday cups, Charge neutralization, Intense beams, PEG1102F, WUAFOSR230-7

AD-A170 905

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AD-A170 869 7/3

SAN DIEGO STATE UNIV CA DEPT OF CHEMISTRY

(U) Kinetic and Product Studies of the Thermal Decomposition of Dimethylsilane in a Single-pulse Shock Tube and in a Stirred Flow Reactor.

88 9P

PERSONAL AUTHORS: Rickborn, S. F. ; Rogers, D. S. ; Ring, M. A. ; O'Neal, H. E. ;

CONTRACT NO. AFOSR-83-0208

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-88-0591

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, V80 n3 p408-414 1986.

ABSTRACT: (U) The Kinetic and product studies of the pyrolysis of dimethylsilane in a single-pulse shock tube (1135-1290 K) and in a stirred flow reactor (890-1000 K) are reported. The shock-induced reaction is accelerated by free-radical and silylene chains which cannot be quenched by trapping agents. The mechanisms of the pyrolysis in various temperature ranges are discussed and modeling results for the stirred flow and shock tube reactions are shown to be in reasonable agreement with experimental observations. Mechanisms for the decomposition of dimethylsilane to ethylene and acetylene via silacyclopropane and silacyclopropene intermediates, respectively, are proposed. Arrhenius parameters for molecular elimination of methane from dimethylsilane are reduced, establishing an activation energy for CH₃SiH insertion into the (C-H) bond of methane of E similar to 24.5 kcal (pressure standard state).

DESCRIPTORS: (U) *SILANES, PYROLYSIS, REACTION KINETICS, SHOCK TUBES, MODELS, REPRINTS

IDENTIFIERS: (U) *Dimethylsilane, *Dimethylsilylene,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 884 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) X-RAY Crystal Structure and Conformational Analysis of
Tetradecamethylcycloheptasilane, (Me₂Si),

85 8P

PERSONAL AUTHORS: Shafiee, Fathieh; Damewood, James R., Jr.
; Haller, Kenneth J.; West, Robert;

CONTRACT NO. F49620-83-C-0044

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-86-0583

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of American Chemical
Society, v107 n24 p8850-8856 1985.

ABSTRACT: (U) The crystal and molecular structure of
tetradecamethylcycloheptasilane (1) has been determined.
Molecules of 1 are of approximate C₂ symmetry and adopt a
twist-chair conformation. Empirical force field (EFF)
calculations indicate that while cycloheptane and 1 adopt
similar twist-chair ground-state structures, these
molecules show significant differences in the structures
of other possible conformations (chair, twist boat, and
boat) and the barriers to their interconversion. The
average Si-Si angle in 1 (118.2) is larger than that
found for other cyclosilanes.

DESCRIPTORS: (U) *SILANES, *CYCLIC COMPOUNDS, CRYSTAL
STRUCTURE, X RAY DIFFRACTION, MOLECULAR STRUCTURE, METHYL
RADICALS, REPRINTS

IDENTIFIERS: (U) Silane/Tetradecamethylcyclohepta,
WUAFOSR-82, PEB1102F

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AD-A170 884 7/4

VALDESBILT UNIV NASHVILLE TN DEPT OF CHEMISTRY

(U) The Calculation of Infrared Intensities,

NOV 85 3P

PERSONAL AUTHORS: Schaad, L. J.; Ewig, C. S.; Hess, B. A.,
Jr.; Michalska, D.;

CONTRACT NO. AFOSR-82-0100, AFOSR-85-0072

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-86-C332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v83
n10 p5348-5349, 15 Nov 85.

ABSTRACT: (U) We show a new method for computing
relative intensities of infrared spectral lines employing
ab initio quantum calculations. It constructs an
approximately uniform electric field relying on
appropriately placed point charges. Examples are
presented using the infrared spectrum of ethylene
computed in two basis sets both by the present method and
by earlier methods. These are compared with experimental
spectra. The two theoretical methods give essentially
identical results, and those in the larger basis give
good agreement with experiment.

DESCRIPTORS: (U) *INFRARED SPECTRA, *SPECTRAL LINES,
COMPUTATIONS, ELECTRIC FIELDS, DIPOLE MOMENTS, ETHYLENE,
REPRINTS

IDENTIFIERS: (U) WUAFOSR2303B2, PEB1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 882 8/20 E/B EIDGENOES (U) CORRELATION OF MUTAGENIC, CARCINOGENIC AND COCARCINOGENIC EFFECTS OF CHEMICAL SUBSTANCES. GRANULOMA POUCH ASSAY. IDENTIFIERS: (U) WUAFOSR2312AB, PEB1102F

THE TECHNISCHE HOCHSCHULE AND ZURICH UNIV (SWITZERLAND) INST OF TOXICOLOGY

DESCRIPTIVE TITLE: Final rept. 1 Sep 82-31 Aug 85.

OCT 85 18P

PERSONAL AUTH (S) Zbinden, Gerhard; Walter, Peter;

CONTRACT NO. AFOSR-82-0338

PROJECT NO. 2312

TASK NO. A

MONITOR: A. J. R. T. 88-0571

UNCLASSIFIED REPORT

ABSTRACT: (U) The research project is concerned with the detection of premalignant and malignant cells induced in vivo in a cell assay system the granuloma pouch assay. Cells exposed to carcinogens in vivo can be studied for DNA damage, chromosomal aberrations, specific locus mutations, cell transformations. Various assays were developed to investigate the growth characteristics of normal, carcinogen-exposed and transformed granuloma pouch cells. These included: primary cloning efficiencies under optimal growth conditions, growth in serum deficient, calcium depleted media, growth in soft agar, growth in primary mouse and rats, growth with cocultured normal cells, growth under influence of growth factors. Phenotypic alterations investigated were the DNA-dispersion in individual cells and the appearance of calcium binding proteins. Furthermore the genotoxic/cytotoxic activity of asbestos fibers was investigated.

DESCRIPTORS: (U) *MUTAGENS, *CARCINOGENS, *GRANULOMA, CELLS(BIOLOGY), ENDOTHELIUM, FIBROBLASTS, NEOPLASMS, CARCINOGENESIS, BIOASSAY, IN VIVO ANALYSIS, CELL DIVISION, CLONES, CELL BIOLOGY, DEOXYRIBONUCLEIC ACIDS, PROTEINS, CALCIUM, ASBESTOS, FIBERS, TOXICITY

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AD-A170 860 CONTINUED

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

PE81102F

(U) Picosecond Nonlinear Resonant Interactions in
Semiconductors

DESCRIPTIVE No. E. Annual rept. no. 4, 1 Jan-31 Dec 85.

MAR 86 28P

PERSONAL AUTH. S. Nurmikko, Arto V. ;

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2308

TASK NO. C2

MONITOR: AF 2
TR 8-0529

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultra-short pulses of laser radiation in order to study coupled electronic and magnetic excitations under selected nonequilibrium conditions. We hoped to generate novel results through experimental research for application to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g. we measured the formation of local, microscopic magnetic oriented 'domains' through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) *SEMICONDUCTORS, *BAND THEORY OF SOLIDS, *RECOMBINATION REACTIONS, *MAGNETIC DOMAINS, PULSED LASERS, CATION COMPOUNDS, LEAD COMPOUNDS, MANGANESE COMPOUNDS, CADMIUM COMPOUNDS, TELLURIDES, MAGNETIC MOMENTS, SOLIDS, ELECTROOPTICS, INFRARED RADIATION

IDENTIFIERS: (U) Lead europium telluride, Barium fluorides, Cadmium manganese selenide, Semimagnetic semiconductors, Spin, Cadmium manganese telluride, Superlattices, Optoelectronics, Resonant interactions, F shell, Bloch states, Magneto-optics, WUAF0SR2306C2.

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LA JOLLA INST CA

(U) Low-Energy Collisions of Excited Atoms.

DESCRIPTIVE NOTE Final rept. 1 May 35-30 Apr 86.

MAY 86 5P

PERSONAL AUTHORS: Naynaber, Roy H.; Tang, Shang Y.

CONTRACT NO. F49620-85-C-0070

PROJECT NO. 231

TASK NO. A4

MONITOR: AFOSR
TR-86-0519

UNCLASSIFIED REPORT

ABSTRACT: (U) The report describes molecular beam studies of ion pair production, chemionization, and measurements of the fraction of excited Na atoms in a composite beam of gas of ground state and excited Na atoms. Some of the experiments involved laser excited Na as a reactant. Included are investigations of excited Na, Na-Cl, metastable He-Li, Li-Cs, and Li-excited Na systems.

DESCRIPTORS: (U) *ATOMIC BEAMS, *PAIR PRODUCTION, *IONIZATION, *ENERGY TRANSFER, EXCHANGE REACTIONS, CROSS SECTIONS, LASER PUMPING, SODIUM, ION BEAMS

IDENTIFIERS: (U) Penning ionization, Chemionization, Ion molecule interactions, WUAFOSR2301A4, PEG1102F

AD-A170 859

AD-A170 845 20/8 7/4

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) Program to Develop an Optical Transistor and Switch.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Apr-30 Sep 85.

OCT 85 25P

PERSONAL AUTHORS: Henningsen, T.; Garbuny, M.; Hopkins, R. H.

REPORT NO. 85-9F42-MJTRN-R2

CONTRACT NO. F49620-84-C-0103

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR
TR-88-0544

UNCLASSIFIED REPORT

ABSTRACT: (U) Work during this period evaluated analytically the concept of multistage optical transistors based on two spectroscopically complementary materials. It is shown that very high total gains can be obtained with either of two alternatives, viz., (1) a chain of discrete complementary transistor units, or (2) a complementary transistor continuum (a concept which has no electronic analog). Whereas the total gain grows exponentially with the number of stages, the required constant photon fluxes grow only linearly with that number. High signal-to-noise ratios can be obtained without the need of cooling. However, the spectroscopic matching conditions of the two complementary materials are stringent. Under the guidance of the theoretical work, a search for suitably matching materials is now underway. (Author)

DESCRIPTORS: (U) *TRANSISTORS, *OPTICS, *SWITCH, *CIRCUITS, STAGING, SPECTROSCOPY, SIGNAL TO NOISE RATIO, RADIATION ABSORPTION, LINEAR SYSTEMS, PHOTONS, *NOISE, CROSS SECTIONS, RESPONSE, LITHIUM, GAIN, SODIUM

IDENTIFIERS: (U) Complementary materials, Collector

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beams, Evans, Control Beams, Optical
translators, ing(Optical), Continuous translators,
PE81102F, M. SR30584

AD-A170 840 9/2

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Experimentation in Software Engineering.

NOV 85 38P

PERSONAL AUTHORS: Basili, Victor R.; Selby, Richard W. Jr.
Hutchens, David H.;

REPORT NO. 1R-1875

CONTRACT NO. F49820-80-C-0001

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-88-0580

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimentation in software engineering supports the advancement of the field through an iterative learning process. This paper presents a framework for analyzing most of the experimental work performed in software engineering over the past several years. We describe a variety of experiments in the framework and discuss their contribution to the software engineering discipline. Some useful recommendations for the application of the experimental process in software engineering are included. (Author)

DESCRIPTORS: (U) *COMPUTER PROGRAMMING, *SYSTEMS ENGINEERING, ITERATIONS, LEARNING, EXPERIMENTAL DESIGN, PLANNING

IDENTIFIERS: (U) *Software engineering, WUAFDSR2304A3, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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AD-A170 838 20/3 4/2

COLORADO UNIV BOULDER

WASHINGTON UNIV SEATTLE

(U) State-Resc Dynamics of Ion-Molecule Reactions in a Flowing Ar Flow.

(U) Radiative Energy Transfer and Thermal Management in Advanced Space Power and Propulsion Systems.

DESCRIPTIVE NOTE Final rept 1 Oct 82-30 Sep 85.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 83-30 Sep 84.

NOV 85.

MAR 86 24P

PERSONAL AUTH: Leone, Stephen R.; Bierbaum, Veronica M. ;

PERSONAL AUTHORS: Mattick, A. T.; Hartsberg, A. ;

INTR. CT NO. 1 10-83-C-0010

CONTRACT NO. AFOSR-83-0367

SUBJECT NO. 2

PROJECT NO. 2301

ASK NO. 81

TASK NO. K2

MONITOR: AFOSR TR-88-0565

MONITOR: AFOSR TR-88-0565

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Extensive set of studies was undertaken utilizing laser induced fluorescence, laser induced fluorescence, and laser induced fluorescence to determine the dynamics of ion molecule reactions in a flowing afterglow apparatus. Detailed product vibrational state distributions were determined for a variety of reactions including heavy atom transfer reactions, charge transfer reactions at low energies, and ion molecule reactions. Absolute branching ratios for production of electronically excited oxygen atoms were measured for reaction of an ion in an electric field. The distribution of an ion in an electric field was characterized and a study of the ion has been initiated.

ABSTRACT: (U) This work involved a theoretical study of radiation transport in droplet clouds, for predicting the performance of the liquid droplet radiator. The effects on droplet sheet emissivity of non isotropic scattering by droplets and of the development of a temperature profile on the droplet sheet are shown to be small.

DESCRIPTORS: (U) AFTERGLOWS, CHEMILUMINESCENCE, LASER INDUCED FLUORESCENCE, VISIBLE SPECTRA, INFRARED SPECTRA, MOLECULAR VIBRATION, MOLECULAR ROTATION, CHARGE TRANSFER, PROTON REACTION

DESCRIPTORS: (U) ELECTROMAGNETIC SCATTERING, CLOUDS, DROPS, RADIATIVE TRANSFER, EMISSIVITY, ANISOTROPY

IDENTIFIERS: (U) Ion molecule interactions, Heavy atoms, WJAFOSR230381 1102F

IDENTIFIERS: (U) LDR(Liquid Droplet Radiator), Stefan Boltzmann Law, Droplet sheets, WJAFOSR2301K2, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 837 9/8 23/8

COLUMBIA UNIVERSITY NEW YORK DEPT OF ELECTRICAL ENGINEERING
(U) Direct Writing of Microstructures for Solid-State Electronics

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 88,

APR 88 84P

PERSONAL AUTHOR: Osgood, Richard M., Jr.

CONTRACT NO. F49820-84-C-0022, ARPA Order 4487

PROJECT NO. 2301

TASK NO.

MONITOR: R
33-055E

UNCLASSIFIED REPORT

ABSTRACT: This report summarizes two years of research in new laser processing techniques on opto- and microelectronics. The main results are in: 1) the demonstration of UV laser direct writing of low resistivity metal lines, and the subsequent demonstration of the usefulness of laser writing (via deposition) in the realization of an LSI circuitry, and 2) the development of a light-guided etching for the fabrication of high-contrast microelectronics structures. In the case of light-guided etching, an application of the optical interconnects has already been demonstrated. (Author)

DESCRIPTORS: (U) *CIRCUIT INTERCONNECTIONS, *MICROELECTRONICS, *LASER BEAMS, *INTEGRATED CIRCUITS, *ULTRAVIOLET, *DEPOSITION, ETCHING, SUBSTRATES, *INDIUM, *TUNGSTEN, MOLYBDENUM, CARBON MONOXIDE, GLASS

IDENTIFIERS: (U) Direct writing, Laser processing, Metal etching, Diffraction gratings, *AFOSR2301A1, *PE81102F

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AD-A170 838 9/2 9/8

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) A Design by Example: Regular Structure Generator.

DESCRIPTIVE NOTE: Master's thesis.

FEB 85 114P

PERSONAL AUTHOR: Banji, Cyrus S. ;

REPORT NO. TR-807

CONTRACT NO. F49820-84-C-0004

PROJECT NO. 2305

TASK NO. 83

MONITOR: AFOSR
TR-88-0501

UNCLASSIFIED REPORT

ABSTRACT: (U) This thesis investigates technical issues concerning the automated generation of highly regular VLSI circuit layouts (e.g. RAMs, PLAs, systolic arrays) that are crucial to the designability and realizability of large VLSI systems. The key is to determine the most profitable level of abstraction, which is accomplished by the introduction of true macro abstraction, interface inheritance, delayed binding, and the complete decoupling of procedural and graphical design information. These abstraction mechanisms are implemented in the Regular Structure Generator, an operational layout generator with significant advantages over first generation layout tools. Its advantages are demonstrated by a pipelined array multiplier layout example. A leaf cell comparator that can make the RSG technology transportable is also investigated. (Author)

DESCRIPTORS: (U) *COMPUTER AIDED DESIGN, *GENERATORS, *INTEGRATED CIRCUITS, *STRUCTURES, *COMPUTER GRAPHIC COUPLING (INTERACTION), RANDOM ACCESS COMPUTER STORAGE, ARRAYS, THESES

IDENTIFIERS: (U) RSG (Regular Structure Generators), Pipelined arrays, DBE (Design By Example), Delayed binding.

AD-A170 838

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 836

CONTINUED

Macro abstr. ion, Cells, Adders, Interface Inheritance,
Decoupling. WJAF0542205B3, PB1102F

AD-A170 833 17/7

TEXAS UNIV AT AUSTIN DEPT OF AEROSPACE ENGINEERING AND
ENGINEERING MECHANICS

(U) Advanced Guidance Algorithms for Homing Missiles with
Bearing-only Measurements.

DESCRIPTIVE NOTE: Annual technical rept.,

MAY 86 10P

PERSONAL AUTHORS: Smyer, Jason L.; Hull, David G.;

CONTRACT NO. AFOSR-84-0371

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSK
TR-86-0595

UNCLASSIFIED REPORT

ABSTRACT: (U) The research of this grant is directed toward the development of an advanced guidance system (navigation filter and guidance law) for a short-range air-to-air missile having a passive seeker (angle-only measurements). During this year, four subjects have been investigated. First, additional experience has been gained with the modified-gain extended Kalman filter; it is becoming apparent that it works the same as or better than the extended Kalman filter for the homing missile problem. Second, a new target-acceleration model has been developed to replace the first-order Gauss-Markov process normally used; this model allows target acceleration vector to rotate and keeps its magnitude within bounds. Third, because the homing missile problem with angle-only measurements is nonlinear, the guidance law affects the performance of the filter; a new guidance law based on maximizing a measure of the size of the information matrix has been developed and has been shown to improve filter performance. Fourth, a study of the use of new theory on fault detection has been initiated; the intent is to use this theory to detect target maneuvers (the target maneuver appears as a fault) so that the filter can be restarted. (Author)

DESCRIPTORS: (U) HOMING DEVICES, KALMAN FILTERING.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 833

CONTINUED

BEARING/DIRECTIONAL
PASSIVE SYSTEMS

41. AIR TO AIR MISSILES. GUIDANCE,
ALGORITHMS

IDENTIFIERS: WJAFOSR2304A3, FEB110ZF

AD-A170 831 9/5 9/1 20/12

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

(U) Investigation of a New Concept in Semiconductor
Microwave Oscillators.

DESCRIPTIVE NOTE: Interim rept.,

NOV 85 4P

PERSONAL AUTHORS: Cooper, James A. , Jr;

CONTRACT NO. AFOSR-85-0193

PROJECT NO. 305

TASK NO. C1

MONITOR: AFOSR
TR-88-0597

UNCLASSIFIED REPORT

ABSTRACT: (U) Our project centers on the fabrication and characterization of a new type of millimeter-wave semiconductor oscillator, the so-called 'Contiguous-Domain' Transferred-Electron Oscillator. To date, the only operational information we have about this device has been derived from computer simulation, and therefore our objective is to obtain experimental verification. The device is interesting (and potentially important) because it operates in a fundamentally different way from any existing semiconductor oscillator device, with the result that it should be capable of very high frequency oscillation (over 100 GHz) without the requirement for sub-micron drift dimensions. In addition, the oscillations are not based on a transit-time effect, and thus the frequency can be changed during operation by simply changing the rate at which carriers are admitted into the drift channel. The structure is similar to a conventional GaAs MESFET or MODFET, except that the gate is made resistive and has two contacts, one near the source and the other near the drain. We will not describe the operation of the device in detail here, but refer the reader to the original proposal and to the enclosed article.

DESCRIPTORS: (U) *MICROWAVE OSCILLATORS, *FIELD EFFECT TRANSISTORS, *GALLIUM ARSENIDES, COMPUTERIZED SIMULATION.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 831 CONTINUED

ELECTRONS

IDENTIFIERS: (U) CDYED(Contiguous Domain Transferred
Electron Oscillator), Drains, Sources, Resistive gates,
Domains, AFSR2305C1, PES1102FR

AD-A170 830 9/4 5/10 9/2 5/2

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Distributed Knowledge Base Systems for Diagnosis and
Information Retrieval.

DESCRIPTIVE NOTE: Annual rept. 1 Jul 84-30 Jun 85.

SEP 85 104P

PERSONAL AUTHORS: Chandrasekaran, B. ;

CONTRACT NO. AFOSR-82-0255

PROJECT NO. 2304

TASK NO. K1

MONITOR: AFOSR
TR-88-0508

UNCLASSIFIED REPORT

ABSTRACT: (U) During the year, progress was made in our research on distributed approaches to knowledge-based problem-solving in the following areas: 1) We have developed an approach called consolidation to reason qualitatively about the behavior of systems of components. This approach and the more classical approach of qualitative simulation are complementary. 2) We have made further progress in developing an architectural framework for diagnostic reasoning. 3) We have elucidated some of the criteria that govern how design plans are selected for further refinement in design problem solving. 4) We have identified a number of generic tasks into which the information processing activity of most of the expert systems can be decomposed. These generic tasks are at a much higher level of abstraction, and this should make knowledge acquisition and explanation for expert systems easier. 5) We have clarified how symbolic qualitative knowledge-based processing helps when problems get complex by considering the concrete task of classification. We compare the pattern recognition and AI approaches to the problem. (Author)

DESCRIPTORS: (U) *REASONING, *COMPUTER AIDED DIAGNOSIS, *PROBLEM SOLVING, *INFORMATION SYSTEMS, INFORMATION RETRIEVAL, FUNCTIONS, DECISION MAKING, COMPUTER AIDED DESIGN, LOGIC DEVICES, DATA BASES, ARTIFICIAL

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 830 CONTINUED

AD-A170 819 7/4 7/3

INTELLIGENCE, QUALITATIVE ANALYSIS, SIMULATION

PRINCETON UNIV NJ DEPT OF CHEMICAL ENGINEERING

IDENTIFIERS (U) Expert systems, Knowledge based systems,
Distribution retrieval, LPN-OSURF-7831PO/714859, PEG1102F,
WUAFOSR2-101

(U) Organosulfur Chemistry on W(211) Surfaces. 1. A
Comparison of Methanethiol and Methanol.

85 8P

PERSONAL AUTHORS: Benziger, Jay B. ; Preston, Richard E. ;

CONTRACT NO. AFOSR-82-0302

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-88-0581

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry,
V88 n23 p5002-5010 1985. See also 2, AD-A170 818.

ABSTRACT: (U) The reactions of methanol and methanethiol on clean, oxidized, sulfided, and carbided W(211) surfaces were studied by LEED, AES, and TPR. Adsorption occurred by an oxidative addition in which the hydroxyl or sulphydryl hydrogen was removed forming methoxy and methanethioxy intermediates. Clean W(211) was a very strong redoxant totally decomposing the molecules. Adsorbed oxygen oxidized the surface making it a weaker reducing agent so that alkoxy and thioxy intermediates were stabilized. An epitaxial surface oxide was a mild oxidant compared to clean W(211); this surface oxidized methanol to formaldehyde. Adsorbed sulfur severely reduced methanol adsorption. Surfaces with adsorbed sulfur methanethiol. This adsorption suggests the formation of disulfide species. Carbided W(211) stabilized both alkoxy and thioxy intermediates as well as oxidizing methanol to formaldehyde. The adsorbed methoxy and methanethioxy intermediates decomposed by C-O or C-S bond scission forming adsorbed methyl groups which either decomposed or were hydrogenated to form methane. At temperatures above 500 K methyl groups recombined and C2 hydrocarbon products evolved. Surface oxides and carbides oxidized methoxy to formaldehyde and CO, but no surface oxidized methanethoxy to thioformaldehyde or CS.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 819 CONTINUED

DESCRIPTORS (U) *SURFACE CHEMISTRY, *SURFACE REACTIONS, *METHANE, *ALCOHOLS, *CARBINOLS, TUNGSTEN, ADSORPTION, OXIDATION REACTIONS, REDUCTION(CHEMISTRY), SULFUR, CARBONS

IDENTIFIERS (U) Methanethiols, Methanol, PES1102F, WUAFOSR2-2

AD-A170 818 7/4 7/3

PRINCETON UNIV NJ DEPT OF CHEMICAL ENGINEERING

(U) Organosulfur Chemistry on W(211) Surfaces. 2. A Comparison of Benzene, Thiophene, and Tetrahydrothiophene.

88 8P

PERSONAL AUTHORS: Preston, Richard E.; Benziger, Jay B.;

CONTRACT NO. AFOSR-82-0302, NSF-CPE82-17384

PROJECT NO. 2302

TASK NO. A2

MONITOR: AFOSR
TR-88-0582

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, V88 n23 p5010-5017 1988. See also 1, AD-A170 819.

ABSTRACT: (U) The interactions of benzene, thiophene, and tetrahydrothiophene with clean, oxidized, and sulfided W(211) surfaces were studied with LEED, AES, and temperature programmed reaction. Benzene and thiophene appear to adsorb as bases making pi-bonds to the surface. Benzene decomposed to yield adsorbed carbon and hydrogen. Thiophene appeared to undergo electrophilic attack at the 2-position forming a carbon bound surface intermediate. This surface intermediate was desulfurized and the resulting hydrocarbon surface intermediate underwent C-C bond scission forming C3 hydrocarbons as the dominate desorption product. The electrophilic attack at the 2-position was shown by methyl group elimination from 2,5-dimethylthiophene. Adsorbed oxygen and sulfur enhanced the adsorption of benzene and thiophene by making the surface more acidic. Tetrahydrothiophene (THT) appear to adsorb as a base, forming a bond between the S(3p) electrons and the surface. Desulfurization of adsorbed THT led to C4 hydrocarbons as the dominate desorption product. Adsorbed oxygen and sulfur inhibited reaction of THT. These results suggest that the surface reactivity and subsequent desulfurization of thiophene is controlled by electrophilic attack on the aromatic ring, and the ensuing reduction of resonance stabilization facilitates

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AD-A170 818 CONTINUED

AD-A170 818 12/2

Author: Val.

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS
STATISTICS AND COMPUTER SCIENCE

DESCRIPTORS: (U) *SURFACE CHEMISTRY, *SURFACE REACTIONS,
*BENZENE, *PHIOPHENES, TUNGSTEN, INTERACTIONS, ADSORPTION,
DECOMPOSITION, SUBSTITUTION REACTIONS, ADSORPTION,
DESULFURATION, HYDROCARBONS, REPRINTS

(U) On Bounds for the Efficiency of Block Designs for
Comparing Test Treatments with a Control.

DESCRIPTIVE NOTE: Technical rept.,

IDENTIFIERS: (U) Thio, w/Tetrahydro, Electrophilic
reactions, PE81102F, WUAF, SR2302A2

JUN 86 24P

PERSONAL AUTHORS: Stufken, John ;

REPORT NO. TR-88-08

CONTRACT NO. AFOSR-88-0320

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0578

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper studies the class of augmented
balanced incomplete block designs, which are used for
comparing a control treatment with a set of test
treatments. Under the A criterion a condition is
established that enables us to determine the most
efficient augmented design and we suggest some methods to
compute a lower bound for the efficiency of these designs.
For $3 < k < \infty$ or $k = \infty$ the parameters of the most
efficient designs with a lower bound for their efficiency
or, if known, mention their optimality.

DESCRIPTORS: (U) *CONTROL THEORY, *SYSTEMS ENGINEERING,
*OPTIMIZATION, EFFICIENCY, LEAST SQUARES
METHOD

IDENTIFIERS: (U) *Block design, BIB(Balanced Incomplete
Block), BIBD(Balanced Incomplete Block Design), PE81102F,
WUAFOSR2304A5

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AD-A170 813 20/12 20/3

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
METEOROLOGY

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Sum Rules for Optical Extinction and Scattering by
Small Particles.(U) Picosecond Nonlinear Resonant Interactions in
Semiconductors.

DESCRIPTIVE NOTE: Annual rept. 18 May 84 18 May 85.

DESCRIPTIVE NOTE: Annual rept. no. 3, 1 Jan-31 Dec 84.

MAR 86 25P

MAR 86 15P

PERSONAL AUTHOR(S): Bohren, Craig F. ;

PERSONAL AUTHORS: Mirmikko, Arto V. ;

CONTRACT NO. AFOSR-84-0145

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2308

PROJECT NO. 2308

TASK NO. C4

TASK NO. C2

MONITOR: AFOSR
TR 88-0517MONITOR: AFOSR
TR-88-0525

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The solution to the problem of scattering by an arbitrary homogeneous sphere (Mie theory) yields an infinite set of coefficients. These scattering coefficients depend on various Bessel functions and their derivatives. The usual approach to computing scattering coefficients is to compute the Bessel functions by recurrence. The Bessel functions in the expressions for the scattering coefficients satisfy recurrence relations. It has been shown that the scattering coefficients themselves satisfy recurrence relations. Whether or not the recurrence relations can simplify scattering calculations must be determined by extensive calculations. It is not known if the recurrence relations are stable, either upward or downward. These matters are for further investigation.

DESCRIPTORS: (U) *MIE SCATTERING, *LIGHT SCATTERING, *OBSCURATION, *RIEKE, *EXTINCTION, *MATHEMATICAL ANALYSIS, *BESSEL FUNCTIONS, *COEFFICIENTS

IDENTIFIERS: (U) Sum rules (Physics), Recurrence relations, Planck's Kronig relations, PEB1102F, WUAFOSR230611

AD-A170 815

AD-A170 813

UNCLASSIFIED

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ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultrashort pulses of laser radiation in order to study coupled electronic and magnetic excitations under selected nonequilibrium conditions. We hoped to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g., we measured the formation of local, microscopic magnetically oriented domains through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) SEMICONDUCTORS, *MAGNETIC MATERIALS, *BAND THEORY OF SOLIDS, *MAGNETIC DOMAINS, CADMIUM COMPOUNDS, MANGANESE COMPOUNDS, LIGHT PULSES, SELENIDES, PULSED LASERS, TELLURIDES, NONLINEAR SYSTEMS, SPECTROSCOPY, REAL TIME, EXCITONS, DYE LASERS

IDENTIFIERS: (U) Cadmium manganese selenide, DMS (diluted Magnetic Semiconductors), BMP (Bound Magnetic Polarons), Resonant interactions, Cadmium Manganese telluride, Neutral impurities, Free excitons, Ionic impurities, Bound excitons, Coulomb centers, Potential wells.

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AD-A170 813 CONTINUED

AD-A170 812 20/12 9/1 20/2

Polations, C. e compensation, PEB1102F, WUAFOSR2308C2

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) High-Quality GaAs MESFET's Grown on Silicon Substrates
by Molecular-Beam Epitaxy,

JUL 85 4P

PERSONAL AUTHORS: Morkoc, H. ; Peng, C. K. ; Henderson, T. ;
Kopp, W. ; Fischer, R. ;

CONTRACT NO. F48820-83-K-0021

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-88-0541

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Electron Devices Letter,
VEOL-6 n7 p381-383 Jul 85.

ABSTRACT: (U) High-quality epitaxial films of 2.3-micron
thick GaAs were grown on 3-in-diam(100) Si substrates
misoriented by 4 deg toward (110). The total morphological
defect density observed was (2000 per sq cm) comparable
to what is obtained on a typical GaAs grown on GaAs in
this particular MBE process. The electron mobilities and
doping levels were 3350 sq cm/Vs and 3×10^{17} to the 17
power per cu cm, which are comparable to GaAs on GaAs of
equivalent parameter MESFET's with a 1 micron gate
lengths, exhibited good saturation and pinch off, no
observable light sensitivity, and transconductances of
about 200 mS/mm. These results are believed to be the
first report of such excellent MESFET quality GaAs
directly grown on Si. (Author)

DESCRIPTORS: (U) *GALLIUM ARSENIDES, *SILICON,
*MOLECULAR BEAMS, *EPITAXIAL GROWTH, *FIELD EFFECT
TRANSISTORS, SUBSTRATES, GATES(CIRCUITS),
PHOTOSENSITIVITY, REPRINTS

IDENTIFIERS: (U) Transconductances, MESFET, PEB1102F,
WUAFOSR2305C1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD A170 811 203 20/5

AD-A170 811 CONTINUED

YALE UNIV NEW HAVEN CONN

IDENTIFIERS: (U) Laser produced plasmas

(U) Population Inversions in Laser-Initiated Vacuum Arcs.

DESCRIPTIVE NOTE: Final rept. 1 Feb 81-31 Jan 88.

JUN 88 75P

PERSONAL AUTHORS: Krishnan, Mahadevan; Haller, Gary L.;

CONTRACT NO. AFOSR 81-0077

PROJECT NO. 2301

TRK NO. AB

EDITOR: AFOSR
TR-88-C-22

UNCLASSIFIED REPORT

ABSTRACT: (U) Population Inversions were studied in laser initiated vacuum arcs. Inversion mechanisms include three body recombination pumping in expanding laser produced plasmas, and resonant photoexcitation using line radiation. Significant gain was measured on the Balmer lines H sub alpha and H sub beta in expanding laser produced plasmas of carbon/polyethylene. Research then focused on resonant photoexcitation of one ion by line radiation from another ion. Fluorescence was measured at UV wavelengths in C III pumped by Al III. A new class of photoexcited ions was identified. In Be like ions, with wavelengths from 2177A in C III pumped by Mn VI, to 200 A in Mg IX pumped by Al XI. Fluorescence and small signal gain were measured in C III pumped by Mn VI. Finally, laser oscillation was demonstrated in C III at 2177 and 2133A. These are the first UV lasers to be pumped by resonant photoexcitation. By isoelectronic scaling, it should be possible to produce soft X-ray lasers using the principles elucidated by this research. Photopumped lasers could prove to be the most efficient soft X ray lasers in the future.

DESCRIPTORS: (U) ELECTRIC ARCS, LASER PUMPING, ULTRAVIOLET LASERS, RECOMBINATION REACTIONS, FLUORESCENCE, POLYETHYLENE, LASER INDUCED FLUORESCENCE, ULTRAVIOLET RADIATION

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SEARCH CONTROL NO. EVN34M

AD-A170 810 17/2

CALIFORNIA STATE UNIVERSITY LOS ANGELES SCHOOL OF ENGINEERING AND APPLIED SCIENCES

(U) Performance Evaluation and Control of Distributed Computer Communication Networks.

DESCRIPTIVE NOTE: Annual report.

SEP 88 42P

PERSONAL AUTHOR: Rubin, Izhak ; Garcia, Mario.

REPORT NO. LA-ENG-85-30

CONTRACT NO. AFOSR-82-0304

PROJECT NO. 4304

TASK NO. A0

MONITOR: AFOSR TR-85-0580

UNCLASSIFIED REPORT

ABSTRACT: (U) During the 1982-1985, performance-period under this AFOSR Grant, we have carried out research investigations and obtained many significant results, of both theoretical and practical importance. A large multitude of computer communication network architectures, models and control schemes have been developed, analyzed and evaluated.

DESCRIPTORS: (U) *COMPUTER COMMUNICATIONS, *COMMUNICATIONS NETWORKS, MULTIPLE ACCESS, SWITCHING CIRCUITS, COMMUNICATIONS, PERFORMANCE(ENGINEERING), INTEGRATED EMS, FIBER OPTICS, TELECOMMUNICATIONS, VIDEO INTERFACED, MULTIPLEXING, ALGORITHMS

IDENTIFIERS: (U) LAN(Local Area Networks), Packet radios, Network protocols, Token rings, Token buses

AD-A170 810

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AD-A170 809

AD-A170 809 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Pattern Recognition Based on Scale Invariant Discriminant Functions.

DESCRIPTIVE NOTE: Technical report.

APR 88 18P

PERSONAL AUTHOR: Pukkila, Tarmo M. ; Rao, C. R. ;

REPORT NO. TR-88-09

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-C578

UNCLASSIFIED REPORT

ABSTRACT: (U) Some probability models for classifying individuals as belonging to one of two or more populations using scale invariant discriminant functions are considered. The investigation is motivated by practical situations where the observed data on an individual are in the form of ratios of some basic measurements or measurements scaled by an unknown non-negative number. The probability models are obtained by considering a p-vector random variable X with a known distribution and deriving the distribution of the random vector $Y = G(X) / 1'X$, where $G(X)$ is a non-negative measure of size such that $G(\lambda X) = \lambda G(X)$ for $\lambda > 0$. Explicit expressions are obtained for the densities of what are called Angular Gaussian, Compositional Gaussian, Type 1 and Compositional Gaussian, Type 2 distributions. (Author)

DESCRIPTORS: (U) *DISCRIMINATE ANALYSIS, *PROBABILITY DISTRIBUTION FUNCTIONS, PATTERN RECOGNITION, POPULATION(MATHEMATICS), MATHEMATICAL MODELS, RANDOM VARIABLES, NORMAL DISTRIBUTION, ESTIMATES, DENSITY

IDENTIFIERS: (U) WJAFOSR2304A5, PE61102F

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AD-A170 808 CONTINUED

AD A170 808 7/4

SYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
PHYSICS

(U) Matrix Effect on the Electronic Partitioning of Iron
Atoms Desorbed from Surfaces by Energetic Ion
Bombardment.

IDENTIFIERS: (U) Partition functions, Steel 1264A,
Electronic partitioning

DESCRIPTIVE NOTE: Technical rept. 1 Nov 84-31 Oct 85.

1 V 88 68

PERSONAL AUTHORS: Kimoek, Fred M.; Pappas, David L.;
Lograd, Nicholas J.

TRACT NO. AFOSR 85-0028, NSF-CHE81-08382

TRACT NO. 2303

TRACT NO. A2

TOR: AFOSR
TR 88-C-13

UNCLASSIFIED REPORT

LEMENTARY NOTE: Pub. in Analytical Chemistry, V57 p13
1989-2874 Nov 85

ABSTRACT: (U) The effect of the sample matrix on the
electronic partitioning of sputtered Fe atoms is examined.
The surface studied are clean and air exposed
polycrystalline Fe, Ni3Fe (111) and NBS 1264a steel. In
contrast to the yield of secondary Fe+ which for all
samples is increased dramatically by surface
contamination), a fraction of ejected ground state Fe
atoms is relatively insensitive to surface contamination.
When the clean samples are subjected to 800 eV argon ion
bombardment, the populations of ejected metastable
excited state Fe atoms are characterized by near
Boltzmann distributions with effective temperatures of
about 700 + or - 100 K. The populations of Fe atoms
sputtered from air exposed surfaces are also near
Boltzmann in character, with effective temperatures 4, to
1400 + or - 200 K.

DESCRIPTORS: (U) ADSORPTION, IRON, ION BOMBARDMENT,
ION SPUTTERING, STEEL, IRON INTERMETALLICS, NICKEL
INTERMETALLICS, SOLTZMANN EQUATION, REPRINTS

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AD-A170 808

4

TORONTO UNIV (CATANIO) INST FOR AEROSPACE
STUDIES

(U) Pseudo-Stationary Oblique-Shock-Wave Reflections in a
Polyatomic Gas: Sulfur Hexafluoride

DESCRIPTIVE NOTE Internl rept.

JAN 88 17 P

SONAL AUTHORS (U), T. G. ;

ORT NO. UTIAS IN-283

TRACT NO. AFOSR 82-0088

JECT NO. 23

CK NO. A1

ATOR: AFOSR
TR-86 15/2

UNCLASSIFIED REPORT

ABSTRACT: (U) Pseudo-stationary oblique shock-wave reflections in sulfur hexafluoride were investigated experimentally and numerically. Over 150 experiments were conducted in a UTIAS 10 x 18 cm Hypervelocity Shock tube in the range of incident shock wave Mach number 1.25 to 2.5 and wedge angle θ deg $\leq$ θ sub θ < 47 deg with initial pressures P sub θ ranging from 4 to 287 torr (0.53 to 90 kPa) and initial temperatures T sub θ near 300 K. The four major types of shock wave reflection, i.e., regular reflection (RR), single-Mach reflection (SMR), complex-Mach reflection (CMR) and double-Mach reflection (DMR) were observed. These were studied with infinite-fringe interferograms using a 23 cm dia field of view Mach-Zehnder interferometer. The isopycnics obtained and the density distributions along the wedge surface are presented for various reflection processes. Four experimental results in argon, air, carbon dioxide and sulfur hexafluoride with the same wedge angle and similar Mach numbers are compared. The analytical transition boundaries between the four types of shock-wave reflection were established up to M sub θ = 10.0 for frozen and vibrational equilibrium sulfur hexafluoride. The numerical results of the second triple-point system

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DESCRIPTORS: (U) *SHOCK WAVES, *REFLECTION, *SULFUR COMPOUNDS, *FLUORIDES, SHOCK TUBES, HIGH VELOCITY, PRESSURE, TEMPERATURE, MACH NUMBER, FLOW, BOUNDARIES, BLAST WAVES, INTERFEROMETRY, GASES, NUMERICAL ANALYSIS, VIBRATION, EQUILIBRIUM(GENERAL), RELAXATION, CANADA

IDENTIFIERS: (U) WUAFOSR2307A1, PE01102F

show that for a given incident shock Mach number, the highest pressure is achieved through a DMR instead of a RR. An application of reflections in pseudo-stationary flow to the interaction of spherical blast waves with a planar surface is shown and discussed.

UNCLASSIFIED

AD-A170 805 8/1 20/12
DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M
AD-A170 805 CONTINUED

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) Quasi Fermi Level Bending in MODFET's and Its Effect
on Field Transfer Characteristics.

JUN 85 8P

PERSONAL AUTHORS: Ponce, F.; Masselink, W. T.; Morkoc, Hadis

CONTRACT NO. F49620-83-K-0021

PROJECT NO. 2305

TASK NO. C1

MONITOR: ACSR
1R-86-0538

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Electron
Devices, VED-32 no p1017-1023 Jun 85.

ABSTRACT: (U) Using Shockley's diffusion/drift model, we calculate the quasi-Fermi level (Imef) bending in the depleted AlGaAs barrier layer of GaAs/AlGaAs MODFET's. We show that the assumption of a constant Imef from the heterointerface through the barrier layer is not justified when the gate is moderately forward biased. Once the barrier-layer conduction band edge at the gate interface falls below that at the heterointerface, the Imef crosses both in the vicinity of the heterointerface and at the gate metal. This has important consequences for the field transfer characteristics and necessitates new considerations for the gate control mechanism. As a result, the electron concentrations in the MODFET channel needed to achieve the equilibrium concentrations are obtained despite the gate being forward biased with voltages close to or larger than the Schottky-barrier height, the gate current is suppressed not only by the barrier at the heterointerface but also by a barrier of about the same height present at the gate metal-semiconductor interface. Experimental results on AlGaAs/GaAs MODFET's are in good quantitative agreement with the theoretical calculations. (Author)

DESCRIPTORS: (U) *FIELD EFFECT TRANSISTORS, *DOPING,

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*FERMI SURFACES, *GALLIUM ARSENIDES, *SCHOTTKY BARRIER DEVICES, INTERFACES, GATES(CIRCUITS), DRIFT, NONLINEAR SYSTEMS, REPRINTS, BIAS IDENTIFIERS: (U) Modfet devices, Aluminum gallium arsenide, Modulation doping, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 804

8/18

8/18

HARVARD MEDICAL SCHOOL BOSTON MA DEPT OF PHYSIOLOGY AND
BIOPHYSICS(U) Pharmacological Resetting of the Circadian Sleep-Wake
CycleDESCRIPTIVE NOTE: Final technical rept. 1 Apr 83-31 Mar
86.

MAY 86

27P

PERSONAL AUTHORS: Moore-Ede, Martin G. ;

CONTRACT NO AFOSR-83-0184

PROJECT NO 2312

TASK NO. A1

MONITOR: AFJSR
TR-88-0848

UNCLASSIFIED REPORT

ABSTRACT: (U) This research program developed strategies to reset the timing of the circadian (approximately 24-hour) sleep-wake cycle so that individuals could be maintained fully awake in any predetermined time in the 24-hour day. This capability would be of direct benefit in minimizing the deleterious effects of jet-lag and could provide alertness in facilities which must be staffed 24 hours a day. The studies utilized a diurnal primate primate, the squirrel monkey (*Saimiri sciureus*). With a well defined circadian neurophysiology and sleep-wake physiology. This animal has a consolidated sleep-wake cycle that is comparable to that in humans. During the three year period of funding, the circadian sleep-wake organization in squirrel monkeys was characterized, and the rate of resynchronization after phase shifts of environmental light-dark cycles was determined.

DESCRIPTORS: (U) *CIRCADIAN RHYTHMS, *JET LAG, *DRUGS, SLEEP, *REST, PHYSIOLOGICAL EFFECTS, SQUIRREL MONKEYS, NEUROPHYSIOLOGY

IDENTIFIERS: (U) Muramy1 Dipeptide, Amlsomycin, Sodium Valproate, WJAFOSR2312A1, PEB1102F

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12/1

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED
MATHEMATICS AND STATISTICS(U) The Multi-Armed Bandit Problem: Decomposition and
Computation.

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85,

SEP 85

16P

PERSONAL AUTHORS: Katehakis, Michael N. ; Veinott, Arthur F.
. Jr.;

REPORT NO. AMS-85-58

CONTRACT NO. AFOSR-84-0138, NSF-ECS83-12358

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0523

UNCLASSIFIED REPORT

ABSTRACT: (U) The multi-armed bandit problems arises in sequentially allocating effort to one of N projects and sequentially assigning patients to one of N treatments in clinical trials. Gittins and Jones (1974) have shown that one optimal policy for the N-project problem, an N-dimensional discounted Markov decision chain, is determined by the following largest-index rule. There is an index for each state of each given project that depends only on the data of that project. In each period one allocates effort to a project with largest current index. The purpose of this paper is to give a short proof of this result and a new characterization of the index of a project in state i, viz., as the maximum expected present value in state i for the restart-in-1 problem in which, in each state and period, one either continues allocating effort to the project or immediately restarts the project in state i. Moreover, it is shown that an approximate largest-index rule yields an approximately optimal policy. These results lead to more efficient methods of computing the indices on-line and/or for sparse transition matrices in large state spaces than have been suggested heretofore. By using a suitable

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Implementation of successive approximations, a policy whose expected present value is within 100 epsilon % of the maximum possible range of values of the indices can be found line with at most $(M+1)M$ operations where M is the number of operations required to calculate one approximation. $f = (ln \epsilon) / (ln a)$ and $0 < a < 1$ is the discount factor. (Author)

DESCRIPTORS: (U) *SEQUENTIAL ANALYSIS, *SCHEDULING, *COMPUTATION, *DECOMPOSITION, *CLINICAL MEDICINE, *APPROXIMATION, *MATHEMATICS, *OPTIMIZATION, *INDEXES

IDENTIFIERS: (U) *Multi armed bandit problem

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DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

(U) Search Algorithms and Their Implementation.

DESCRIPTIVE NOTE: Annual rep., 1 Jul 84-30 Jun 85.

AUG 85 20P

PERSONAL AUTHORS: Loveland, D. W. ;

CONTRACT NO. AFOSR-83-0208

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR
TR-88-0530

UNCLASSIFIED REPORT

ABSTRACT: (U) Papers completed this year include (1) correcting natural language input using expectations, (2) fast algorithms for finding some boundary sets of binary monotone set functions, and (3) a review of automatic programming techniques. Work on search with limited resources and a study of automating rule strength determination for rule-based systems should be completed this coming year. Work continues on approximation algorithms for the test-and-treatment problem and a new effort is underway in learning mechanisms with a focus on a method for comparing learning mechanisms that has already yielded a promising new learning strategy.

DESCRIPTORS: (U) *SEARCHING, *ALGORITHMS, NATURAL LANGUAGE, INPUT, MONOTONE FUNCTIONS, AUTOMATIC PROGRAMMING, ARTIFICIAL INTELLIGENCE

IDENTIFIERS: (U) Expert systems, WUAF03R2304A7, PE81102F

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STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED
MATHEMATICS AND STATISTICS

(U) Computing Optimal Sequential Allocation Rules in
Clinical Trials.

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85.

SEP 85 13P

PERSONAL AUTHORS: Katerakis, Michael N ; Derman, Cyrus ;

REPORT NO AMS-85-89

CONTRACT NO AFOSR-84-0130

PROJECT NO 2304

TASK NO A5

MONITOR: AFOSR
TR-86-0521

UNCLASSIFIED REPORT

ABSTRACT (U) The problem of assigning one of several
treatments in clinical trials is formulated as a
discounted bandit problem that was studied by Gittins and
Jones. The problem involves comparison of certain state
dependent indices. A recent characterization of the index
is used to calculate more efficiently the values of these
indices (Author)

DESCRIPT PS: (U) *MEDICAL SERVICES, *COMPUTATIONS,
*CLINICAL MEDICINE, INDEXES, ALLOCATIONS, OPTIMIZATION,
BAYES THEOREM, TABLES(DATA), DYNAMIC PROGRAMMING,
STATISTICAL ANALYSIS

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AD-A170 800 11/8

CORNELL UNIV ITHACA NY DEPT OF MATERIALS SCIENCE AND
ENGINEERING

(U) Mechanistic Understanding of Powder Compaction in
Metals.

DESCRIPTIVE NOTE: Annual technical rept. 1 Apr 84-15 Feb
86.

MAR 86 37P

PERSONAL AUTHORS: Raj, Rishi ;

CONTRACT NO. AFOSR-84-0133

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-86-0505

UNCLASSIFIED REPORT

ABSTRACT: (U) In this, the first annual report, results
from hot pressing experiments on NiAl(1-x) powders are
described. The stoichiometry of the alloy is varied in
the range 0.84 < x < 0.52. The change in composition allows
us to change the diffusion coefficient by nearly two
orders of magnitude. The principal mechanisms of powder
compaction are plastic flow (by dislocations) and
diffusional transport. The relative contribution of these
two mechanisms can, therefore, be separated by varying
the composition. Also, the dislocation mechanism is
expected to dominate when densification is carried out at
high stresses. Dislocation activity is also expected to
influence microstructure evolution by dynamic
recrystallization. The results described in this report
demonstrate that the diffusional and dislocation
mechanisms can indeed be separated by changing the stress
and the composition. At high stresses, we have found
evidence of precipitation of new grains at interfaces.
Current and future work is being directed toward
understanding the role of shear strain in densification
and in microstructure evolution during powder compaction.
(Author)

DESCRIPTORS: (U) *POWDER METALS, *HOT PRESSING, NICKEL.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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ALUMINUM, COATING, DENSITY

IDENTIFIERS: (U) Densification, WJAFOSR2308A1

AD-A170 787 7/4

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) Proceedings of the Topical Meeting on the Microphysics of Surfaces, Beams, and Adsorbates Held in Santa Fe, New Mexico on 4-6 February 1985.

DESCRIPTIVE NOTE: Final rept. 1 Nov 84-18 Dec 85.

DEC 85 208P

PERSONAL AUTHORS: Quinn, Jarvis W. ;

CONTRACT NO. AFOSR-85-0018

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-86-0489

UNCLASSIFIED REPORT

ABSTRACT: (U) The Topical Meeting on Microphysics of Surfaces, Beams, and Adsorbates was organized within the interdisciplinary area of molecule/surface interactions induced, or studied, by laser and ion beam techniques. Especially emphasized was the molecular physics and electro magnetism of beam activated chemical reactions for applications in fabrication of semiconductor devices, in photocatalysis, and in optical recording. Emphasis was on the laser spectroscopy or molecular collision and reaction processes on surfaces, new sensitive or high resolution spectroscopies for studies of adsorbates, and optical methods applied to surface characterization.

DESCRIPTORS: (U) *SURFACE CHEMISTRY, *MOLECULAR BEAMS, *ADSORBATES, ETCHING, SILICON, SPUTTERING, HALOGENS, ION BOMBARDMENT, EPITAXIAL GROWTH, CADMIUM TELLURIDES, MERCURY COMPOUNDS, VAPOR PHASES, CARBON MONOXIDE, STARK EFFECT, CHLORINE, SYMPOSIA, TRIMETHYLALUMINUM

IDENTIFIERS: (U) LTID(Laser Induced Thermal Desorption). Spectroelectrochemistry, Cadmium mercury tellurides, Second harmonic generation, PE81102F

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BATTTELLE COLUMBUS DIV OH

AD-A170 778 8/10

MICHIGAN UNIV ANN ARBOR

(U) Laser Produced X-Ray for High Resolution Lithography and a Photoionization Laser.

(U) High-Resolution Analysis of Eye Movements.

DESCRIPTIVE NOTE: Final rept.,

DESCRIPTIVE NOTE: Final rept. 15 Jun 83-15 Nov 84.

FEB 83 83P

APR 86 12P

PERSONAL AUTHORS: Epstein, Harold ; Applebaum, Dave ; Campbell, Bernard ;

PERSONAL AUTHORS: Jonides, John ;

CONTRACT NO. AFOSR-82-0086

CONTRACT NO. AFOSR-83-0289

PROJECT NO. 2301

PROJECT NO. 2917

TASK NO. A8

TASK NO. A4

MONITOR: AFOSR
TR-88-0583MONITOR: AFOSR
TR-88-0512

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT (U) The majority of the project was spent investigating laser produced x rays for high resolution lithography. This work involved measurements over an extensive parameter matrix. Specifically, efficiency of conversions to x rays was qualified as a function of (1) laser pulse energy, (2) laser pulse width, (3) plasma profile, (4) laser wavelength, (5) target atomic number, (6) initial focal area, and (7) focal ratio of the lens. Experimental research was performed on a photoionization x ray laser concept. Specifically, a thin polyethylene, oxidized carbonate film was vaporized. Fifteen nanoseconds into its expansion, the vapor was illuminated by a 200 psec Fe spectrum x ray pulse. Photoionization of the inner K shell of oxygen was then observed. The potential efficiency of this type of laser was found to be comparatively low.

ABSTRACT: (U) A computerized laboratory was constructed to monitor eye movements, to present visual stimuli, and to collect and record the performance of human subjects in information processing tasks. (Author)

DESCRIPTORS: (U) *EYE MOVEMENTS, COMPUTER APPLICATIONS, MONITORING, HIGH RESOLUTION, PERFORMANCE (HUMAN), DATA ACQUISITION, STIMULI, INFORMATION PROCESSING

IDENTIFIERS: (U) WJAFOSR2917A4, PE01102F

DESCRIPTORS: (U) *X RAY APPARATUS, *LASER PUMPING, *PHOTO LITHOGRAPHY, X RAYS, PHOTOIONIZATION, TRANSMISSIVITY, FOILS (MATERIALS), BERYLLIUM

IDENTIFIERS: (U) Laser produced x rays, PE01102F, WJAFOSR2917A4

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SEARCH CONTROL NO. EVN34M

AD-A170 778

12/2

GEORGIA INSTITUTE OF TECH ATLANTA SCHOOL OF INDUSTRIAL AND
SYSTEMS ENGINEERING

(U) Stochastic Bounds on Distributions of Optimal Value
Function with Applications to Pert. Network Flows and
Reliability.

JUL 85 31P

PERSONAL AUTHORS: Weiss, Gideon ;

REPORT NO. GIT-J-85-10

CONTRACT NO. AFOSR-84-0387

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR 85-0542

UNCLASSIFIED REPORT

ABSTRACT: (U) Mellijson and Nadas (1979) have obtained
stochastic bounds in the convex majorization sense to the
critical path length of a project network with random
activity durations. This paper presents those results in
a more general framework and, using similar techniques,
obtain bounds for shortest route, maximal flow and
reliability system lifetime. (Author)

DESCRIPTORS: (U) *OPERATIONS RESEARCH, *STOCHASTIC
PROCESSES, PATHS, CRITICALITY(GENERAL), LENGTH,
RELIABILITY, PERT, NETWORK FLOWS, ROUTING

IDENTIFIERS: (U) *Stochastic bounds, WUAFOSR2304A5,
PE61102F

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AD-A170 772 9/5 20/12

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

(U) Investigation of a New Concept in Semiconductor
Microwave Oscillators.

DESCRIPTIVE NOTE: Annual rept. 1 May 85-30 Apr 88.

MAY 86 32P

PERSONAL AUTHORS: Cooper, James A., Jr;

CONTRACT NO. AFOSR-85-0193

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR
TR 86-0527

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates. All
DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) The goal of this research is to fabricate
and characterize a new type of semiconductor device known
as a contiguous-domain transferred oscillator. This
device differs from existing semiconductor oscillators in
several fundamental ways, and should be capable of direct
electronic tuning in the range from a few gigahertz to a
few hundred gigahertz. During the first year of this
project, test chips were designed, masks were made, and a
processing schedule was worked out. Three aspects of the
processing required special attention: Implant activation,
resistive gate formation, and silicon nitride deposition.
Uncapped flash annealing was used for implant activation,
and satisfactory results were achieved.

DESCRIPTORS: (U) *MICROWAVE OSCILLATORS, *SEMICONDUCTORS,
ELECTRODES, TUNING DEVICES, CHIPS(ELECTRONICS),
GATES(CIRCUITS), SILICON COMPOUNDS, NITRIDES, ION BEAMS,
THIN FILMS, NICKEL, MANGANESE, CHROMIUM, GALLIUM
ARSENIDES, WAFERS, TRANSPARENCIES, ETCHING, FABRICATION,
ALLOYS

IDENTIFIERS: (U) CDT0(Contiguous Domain Transferred
Oscillators), Resistive gates, Silicon nitrides, Buried

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Channel's Flash annealing, Implant activation,
Electrodes (Gate), Draw electrodes, WUAFOSR2305C1,
PL811C1 Source Electrodes

AD-A170 771 20/3 20/8

PANAMETRICS INC WALTHAM MASS

(U) Absorption and Scattering by Conductive Fibers: Basic
Theory and Comparison with Asymptotic Results.

DESCRIPTIVE NOTE: Annual rept. May 84-Sep 85.

OCT 85 88P

PERSONAL AUTHORS: Pedersen, N. E.; Pedersen, J. C.;
Waterman, P. C.;

CONTRACT NO.: F49620-84-C-004B

PROJECT NO. 2306

TASK NO. C4

MONITOR: AFOSR
TR-86-0516

UNCLASSIFIED REPORT

ABSTRACT: (U) A theory based on the variational method, along with associated computer codes, has been developed for analyzing the electromagnetic scattering and absorption from thin conductive fibers of arbitrary size, conductivity and orientation. Extensions and refinements of this theory have now been completed and programmed. A summary is given of the basic equations used in the variational computation for arbitrary fibers. The quasistatic model appropriate at long wavelengths is then derived, followed by the infinite cylinder computation which should be accurate for wave lengths short compared with cylinder length. In order that the computations may be extended into the infrared and visible regimes, it is necessary to incorporate the optical properties of the fibers. Curved fibers are considered in this report. An exact integral equation is derived for the general case, and some approximate results are then given for special fibers. Also discussed are the optimum conditions for target obscuration by a cloud of particles from a mass efficiency standpoint. Particle optimization studies are performed under varying requirements on absorption, reflection and transparency of the particle cloud.

DESCRIPTORS: (U) *ELECTROMAGNETIC SCATTERING, *FIBERS,
*OBSCURATION, THINNESS, ELECTRIC CONDUCTORS, RADIATION

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ABSORPTION, M. CROMWELL, INFRARED SPECTRA, OPTICAL
PROPERTIES, INTEGRAL EQUATIONS, TRANSPARENCY, VARIATIONAL
METHOD, COMPLEXIFIED SIMULATION, METAL FIBERS,
LEAD(II), COPPER

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS
STATISTICS AND COMPUTER SCIENCE

(U) Optimal Step Type Designs for Comparing Test
Treatments with a Control.

IDENTIFIERS: (U) Drude model, WUAFOSR2308C4, PE61102F

DESCRIPTIVE NOTE: Interim report.

JUN 86 18P

PERSONAL AUTHORS: Cheng, C. S.; Majumdar, D.; Stufken, J.;
Ture, T. E.

REPORT NO. TR-88-03

CONTRACT NO. AFOSR-88-0320, AFOSR-80-0170

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0577

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of obtaining A optimal designs
for comparing v test treatments with a control in b
blocks of size k each is considered. A step type design
is a BTIB design in which the control is replicated t
times in some blocks and t + 1 times in the remaining
blocks. A condition on the parameters (v, b, k) is
identified for which optimal step type designs can be
obtained. Families of such designs are given. Methods for
searching for highly efficient designs are proposed, for
situations where it is difficult to determine an A
optimal design.

DESCRIPTORS: (U) *CONTROL THEORY, *SYSTEMS ENGINEERING,
EXPERIMENTAL DESIGN, OPTIMIZATION, MATRICES(MATHEMATICS)

IDENTIFIERS: (U) *Block design, Homoscedasticity,
BTIB(Balanced Treatment Incomplete Block), WUAFOSR2304A5,
PE61102F

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NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESS

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Recent Developments in Probabilistic Geotechnical Engineering

(U) The Polysilane High Polymers.

88 21P

DESCRIPTIVE NOTE: Rept. for Nov 83 Aug 84.

PERSONAL AUTHORS: West, Robert ;

DEC 83 8P

CONTRACT NO. F49620-83-C-0044

PERSONAL AUTHORS: Hasofer, A. M. ;

PROJECT NO. 2303

REPORT NO. TR-40

TASK NO. 82

CONTRACT NO. F49620-85-C-0144

MONITOR: AFOSR
TR-88-0585

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR 88 0800

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SUPPLEMENTARY NOTE: Pub. in Proceedings of the International Symposium on Recent Developments in Laboratory and Field Tests and Analysis of Geotechnical Problems, 5p 1983.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic Chemistry, v300 p327-340 1980.

ABSTRACT: (U) A review of the published literature of organopolysilane high polymers, including history, synthesis, electronic properties, photochemistry, chemical and crosslinking reactions. The technological applications of polysilanes as precursors to silicon carbide, as photoresists for microelectronics and as photoinitiators for vinyl polymerization are also covered.

ABSTRACT: (U) New and extended work in some areas of probabilistic geotechnical engineering are presented in a largely non-technical fashion. The areas covered are the following: Measuring soil properties, including geostatistics, graphical analysis, choice of estimators, factor analysis and updating parameter distributions; Markov processes, including micro-macro models and program slope failure; Probabilistic design with special reference to Level II design methods and slope stability. (Author)

DESCRIPTORS: (U) *POLYSILANES, ORGANIC CHEMISTRY, POLYMERS, PHOTOCHEMICAL REACTIONS, SYNTHETIC CHEMISTRY, CROSSLINKING(CHEMISTRY), RADIATION ABSORPTION, ULTRAVIOLET RADIATION, SILICON CARBIDES, VINYL PLASTICS, REPRINTS

DESCRIPTORS: (U) *SOIL MECHANICS, *MATHEMATICAL MODELS, *SYMPOSIUM, PROBABILITY, SLOPE, STABILITY, REPRINTS

IDENTIFIERS: (U) *Geotechnical engineering.

UWAFOSR 448, PE61102F

IDENTIFIERS: (U) Organopoly silanes, Polysilane/alkenyl, UWAFOSR230382, PE61102F

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NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC SCIENCE
YALE UNIV NEW HAVEN CT DEPT OF OPHTHALMOLOGY AND VISUAL SCIENCE

(U) A Stochastic Process That is Autoregressive in Two Dimensions of Time.

DESCRIPTIVE NOTE: Technical rept. Nov 83 Aug 84.

86 8P

PERSONAL AUTHOR: DEHaan, L. ;

REPORT NO. TR-84

CONTRACT NO. F49620-82-C-0008

PROJECT NO. 2104

TASK NO. A5

MONITOR: AF 3
TR 3-0593

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Statistica Neerlandica, V40
n1 p38-45 1984.

ABSTRACT: (U) A continuous time stationary process is discussed. It is autoregressive in one direction of time and is autoregressive in the other direction. A discrete time version of the process was discussed in Chernick (1980). A related continuous time process is discussed in Weiss (1980).

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, *MATHEMATICAL MODELS, *WATER FLOW, *SOLAR ENERGY, RIVERS, ENERGY STORAGE, *STATISTICS, REPRINTS

IDENTIFIERS: (U) *Autoregressive processes, WJAFOSR2304 5, PE61102F

AD-A170 781

UNCLASSIFIED

(U) A Model for the Processing of Position Information in the Human Visual System.

DESCRIPTIVE NOTE: Technical rept..

SEP 83 41P

PERSONAL AUTHORS: Hirsch, Joy ; Hyllon, Ron ;

REPORT NO. TR-8304

CONTRACT NO. F49620-83-C-0028

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-86-0540

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Columbia Univ. Dept. of Physics., New York, NY.

ABSTRACT: (U) We present a model for the processing of positional information in the human visual system, with particular emphasis on visual tasks that involve the measurement of spatial separation. The model is in many respects a radical departure from current thinking about problems in vision. Of particular note is the fundamental significance we attach to the retinal photoreceptor lattice, considered as a two-dimensional spatial sampling system. Mechanisms of neural interpolation are discussed and hyperacuity is a natural consequence of the model. Major concerns which we do not address are questions of temporal dependence and the integration of binocular information. We refer to the model as the scaled lattice model.

DESCRIPTORS: (U) *VISION, *INFORMATION PROCESSING, *POSITION(LOCATION), SPACE(ROOM), MODELS

IDENTIFIERS: (U) Scaled lattice model, PE61102F, WJAFOSR2313A5

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DTIC REPORT BIBLIOGRAPHY

AD-A170 755 B/10 B/10

YALE UNIV - NEW HAVEN CT DEPT OF OPHTHALMOLOGY AND VISUAL SCIENCE

(U) Limits of Pattern Discrimination in Human Vision.

DESCRIPTIVE NOTE: Final rept. Jan 83-Dec 85.

FEB 86 30P

PERSONAL A. THORS: Hirsch, Joy ;

CONTRACT NO: F49620-83-C-0028

PROJECT NO: 2313

TASK NO.: A5

MONITOR: AFOSR
TR-88-0549

UNCLASSIFIED REPORT

ABSTRACT: (U) This investigation was focused on identification of various limits of human spatial discrimination, two-dimensional sampling properties of the retinal photoreceptor lattice, and the consequences for spatial vision. Highlights from this study are briefly listed: 1) Foveal Spatial Discriminations are hyperacuity tasks; 2) The spatial-frequency discrimination function (delta f/f vs f) is segmented; 3) The discrimination segments can be related to retinal sampling; 4) Scaling mechanisms apply to low resolution tasks; 5) The photoreceptor lattice is a highly ordered hexagonal array; 6) A hexagonal component exists in spatial discrimination; 7) A new 'metric' model of spatial vision is based on visual sampling

DESCRIPTORS: (U) *VISUAL PERCEPTION, *DISCRIMINATION, PATTERN, RETINA, PHOTORECEPTORS, TWO DIMENSIONAL, SAMPLING, FOVEA, LOW RESOLUTION

IDENTIFIERS: (U) Spatial vision, Hyperacuity, Webers law, PE1102F, WUAFOSR2313A5

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SEARCH CTRL NO EVN34M

AD-A170 755 B/1 B/10 B/10

TEXAS UNIV HEALTH SCIENCE CENTER AT DALLAS DEPT OF CELL BIOLOGY AND ANATOMY

(U) The Role of Central Monoaminergic Systems in Arousal and Selective Attention.

DESCRIPTIVE NOTE: Annual rept. 1 Mar 85-28 Feb 88.

MAR 88 8P

PERSONAL AUTHORS: Waterhouse, Barry D. ;

CONTRACT NO: AFOSR-88-0108

PROJECT NO: 2312

TASK NO.: A3

MONITOR: AFOSR
TR-88-0414

UNCLASSIFIED REPORT

ABSTRACT: (U) The work described here is part of an ongoing set of studies aimed at characterizing the physiological actions and anatomical organization of the monoaminergic projection systems to the rat cerebral cortex, cerebellum and hypothalamus. The underlying theme of this work is that the endogenous monoamines, norepinephrine (NE) and serotonin (5-HT), serve to modulate central neuronal responsiveness to afferent synaptic inputs and by so doing participate in the cognitive process of selective attention. Specifically, individual studies describe: 1) the effects of NE and 5-HT on rat visual and somatosensory cortical neuron responses to afferent pathway stimulation, 2) topographic organization of the neocortical projection neurons in the serotonergic dorsal raphe nucleus, 3) pharmacological characterization of NE effects in rat lateral hypothalamus and 4) similarity between the modulatory actions of NE and stimulant drugs, cocaine and amphetamine. Overall, the data provide further support for the contention that the diffusely distributed monoamine systems of the mammalian brain may enhance the performance of target neuronal circuits as a function of changing behavioral conditions.

DESCRIPTORS: (U) *CENTRAL NERVOUS SYSTEM, *AWARENESS,

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ATTENTI •AMINES, •NEUROCHEMICAL TRANSMISSION, CEREBRAL
CORTIX: •REBELLUM, HYPOTHALAMUS, SEROTONIN, SYNAPSE,
COGNIT: VISUAL CORTIX, NERVE CELLS, RESPONSE(BIOLOGY),
STIMULA •(PHYSIOLOGY), PHARMACOLOGY, RATS

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF GEOLOGY
AND GEOPHYSICS

(U) Relationship between Near-Field and Telesismic
Observations of Seismic Source Parameters.

IDENTIFI (U) •Monoamines, Norepinephrine, PE81102F,
WJAFGS...12A3

DESCRIPTIVE NOTE: Final rept. 1 Feb 83-31 May 85,

MAY 85 288P

PERSONAL AUTHORS: Alexander, Shelton S. ;

* CONTRACT NO. AFOSR-82-0084, ARPA Order-4397

PROJECT NO. 2309

TASK NO. A2

MONITOR: AFOSR
TR-88-0554

UNCLASSIFIED REPORT

ABSTRACT: (U) Contents: (1) Estimates of Source and Path
Characteristics in the USSR and North America Using Short
Period (Lg) and Long-Period Surface Wave Dispersion and
Spectral Excitation; (2) Analysis of the New Brunswick,
1982, Earthquake Sequence with Inferences on Source
Parameters from Multi-Mode Surface Wave Dispersion and
Spectral Excitation (M.S. Thesis of C. Nichols).

DESCRIPTORS: (U) •SEISMIC WAVES, •EARTHQUAKES, USSR,
NORTH AMERICA, SOURCES, PATHS, SURFACE WAVES, SCATTERING,
EXCITATION, SPECTRA, NEW BRUNSWICK, MULTIMODE, WAVE
PROPAGATION, THESES

IDENTIFIERS: (U) Seismic sources, PE81102F,
WJAFOSR2309A2

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DTIC REPORT BIBLIOGRAPHY

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COMING GLASS WORKS NY

(U) Plus the glasses for Bulk Optical and Waveguide Applications.

DESCRIPTIVE NOTE: Final rept. 18 Aug 84-14 Aug 85.

JAN 85 21P

PERSONAL AUTHORS: Tick, P. A. ;

CONTRACT NO. F49620-84-C-0088

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-88-0870

UNCLASSIFIED REPORT

ABSTRACT (U) The overall goal of the research was to develop a wide transmission window heavy metal fluoride glass (HMF) which could eventually be compatible with chemical vapor deposition (CVD) forming. During the first two years of contract work, a new composition field, i.e., $2LiF \cdot AlF_3 \cdot PbF_2$ glasses, were identified and the basic chemistry and properties of the system determined. Since the intent of the work is to use such glasses for bulk IR optics or for ultra-low-loss OMG fibers further characterization was required. It remained to establish the utility of these glasses as practical infrared transmitting materials. This required that a method for removing water be found and that the effects of infrared absorbing impurities be determined. Work in these two areas constituted much of the recent effort.

DESCRIPTORS (U) *OPTICAL GLASS, *INFRARED EQUIPMENT, *FLUORIDES, *CADMIUM COMPOUNDS, LITHIUM COMPOUNDS, ALUMINUM COMPOUNDS, LEAD COMPOUNDS, SALTS, WATER

IDENTIFIERS (U) HMFGL(Heavy Metal Fluoride Glass), CLAPIC(Lead Lithium Aluminum Lead), Heavy metals, Zinc oxides, PEG1102F

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SEARCH CONTROL NO. EVN34M

AD-A170 730 8/3

MISSOURI UNIV-ST LOUIS DEPT OF PHYSICS

(U) Quantum 1/f Noise in Submicron Devices and Quartz Resonators.

DESCRIPTIVE NOTE: Final technical rept. 15 Jul 84-14 Jul 85.

OCT 85 28P

PERSONAL AUTHORS: Handel, Peter H. ;

CONTRACT NO. AFOSR-84-0228

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-88-0850

UNCLASSIFIED REPORT

ABSTRACT (U) The work performed under this grant has allowed for the first time a unified description of 1/f noise in the mobility, the surface and bulk recombination speed, the injection, emission, trapping and tunneling processes in submicron devices and quartz resonators and surface acoustic wave devices. All noise sources mentioned above have been expressed in terms of a fundamental formula which in essence equates the spectral density of fractional cross section fluctuations (e.g. scattering cross sections which determine the frequency of collisions, the relaxation time and the mobility) with the quadratic carrier velocity change in units of the speed of light, for the process considered, multiplied by the fine structure constant $1/137$. The applications to various submicron devices such as HEMT, HJF, n(+)-p diodes, photodetectors have given a good fit to experimental data without free parameters.

DESCRIPTORS (U) *QUANTUM ELECTRONICS, *NOISE(ELECTRICAL AND ELECTROMAGNETIC), QUARTZ RESONATORS, SURFACE ACOUSTIC WAVE DEVICES, CARRIER MOBILITY, TRAPPING(CHARGED PARTICLES), TUNNELING(ELECTRONICS), SCATTERING CROSS SECTIONS, FIELD EFFECT TRANSISTORS

IDENTIFIERS (U) Hooge parameters, WUAFOSR2305C1,

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SEARCH CONTROL NO. EVN34M

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PE81102F

AD-A170 888 9/2

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Parallel Matrix Computations.

DESCRIPTIVE NOTE: Interim rept. Apr 85-Apr 86.

MAY 86 12P

PERSONAL AUTHORS: Stewart, G. W.; O'Leary, Dianne P.;

CONTRACT NO. AFOSR-82-0078

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0548

UNCLASSIFIED REPORT

ABSTRACT: (U) This project concerns the design and analysis of algorithms to be run in a processor-rich environment. The authors focus primarily on algorithms that requires no global control and that can be run on systems with only local connections among processors. They investigate the properties of these algorithms both theoretically and experimentally. The experimental work is done on the Z408, a working parallel computer operated by the Laboratory for Parallel Computation of the Computer Science Department at the University of Maryland. To give this work direction, they focused on two areas: Dense problems from numerical linear algebra; and The iterative and direct solution of sparse linear systems. (Author)

DESCRIPTORS: (U) ALGORITHMS, COMPUTATIONS, PARALLEL PROCESSING, LINEAR ALGEBRA, LINEAR SYSTEMS, SPARSE MATRIX, BIBLIOGRAPHIES, REPORTS, ABSTRACTS

IDENTIFIERS: (U) WJAFDSR2304A3, PE81102F

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AD-A170 698 CONTINUED

DREXEL DIV PHILADELPHIA PA DEPT OF MATERIALS
ENGINEER

(U) A Fundamental Study of P/M Processed Elevated
Temperature Aluminum Alloys.

Similar studies have been initiated in which a mechanical
alloying step is introduced prior to powder consolidation.
(Author)

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 83-30 Sep
84.

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *HIGH TEMPERATURE,
CREEP, TENSILE PROPERTIES, YIELD STRENGTH, POWDER
METALLURGY, MICROSTRUCTURE

IDENTIFIERS: (U) WJAFUSR2308A1, IE81102F

OCT 84 27P

PERSONAL AUTHORS: Lawley, A. ; Koczak, M. J.

CONTRACT NO. AFOSR-82-0010

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
IR-88-0686

UNCLASSIFIED REPORT

ABSTRACT (U) Elevated temperature tensile and creep
properties of powder metallurgy Al-Fe-Ni alloys with
Fe/NiAl dispersoid volume fractions of 0.19, 0.25 and 0.
32 are being examined with respect to processing mode,
microstructure and microstructural stability. The overall
objective is to establish a basic understanding of
process-microstructure relations in this new class of
alloys in order to provide design guidelines with respect
to life in service stresses and temperature. Tests have
been conducted at temperatures up to 400 C. Ambient
temperature strengthening can be explained by the Orowan
dislocation bowing model. Yield strength decreases with
increasing temperature and above 300 C, it is independent
of dispersoid size and dispersoid volume fraction. Steady
state creep rate is independent of the dispersoid volume
fraction over the temperature range 250 C - 400 C, and
the activation stress exponent is 10 with a creep activation
energy of 178 Kcal/mole. Elevated temperature deformation
is consistent with a cooperative dislocation climb
mechanism which is insensitive to dispersoid size and
dispersoid volume fraction. The data and observations
confirm the benefits of a dual powder metallurgy/rapid
solidification approach with respect to enhanced
microstructural stability at elevated temperatures.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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DREXEL (IN) PHILADELPHIA PA DEPT OF MATERIALS
ENGINEERING

(U) A Fund. 'al Study of P/M Processed Elevated
Tempera. e Aluminum Alloys.

DESCRIPTIVE A-IE: Annual technical rept. 1 Oct 84-30 Sep
85.

OCT 85 28P

PERSONAL AUTHOR(S): Lavley, A.; Koczak, M. J. ;

CONTRACT NO. AFOSR-82-0010

PROJECT NO. 2308

TASK NO. A1

MONITOR: A-170
Tr 83-0567

UNCLASSIFIED REPORT

ABSTRACT: (U) The ambient and elevated temperature strength and microstructural stability of powder processed Al-Fe-Mn alloys are being evaluated with respect to processing mode, microstructure, and microstructural stability. The overall objective is to establish a basic understanding of processing microstructural relations in this new class of alloys in order to establish design guidelines for limiting stresses at elevated temperatures. In the current program year, rapidly solidified pre-alloyed powder containing 0.19 volume fraction of FeNiAl9 dispersoid (similar to 0.18 microstructure as mechanically alloyed (MA) and subsequent hot extruded to full density. The MA alloy is stronger than the non MA alloy at temperatures up to about 300 C. In addition, MA enhances microstructural stability at elevated temperatures; for example there is no significant coarsening of the FeNiAl9 after 824 hours at 480 C. Movements in alloy strength and stability are attributed to the presence of fine scale (similar to 30 nm) oxide and carbides introduced during MA, and which are distributed uniformly throughout the matrix, at boundaries in metallic interfaces, and on subgrain boundaries. This fine-scale dispersoid provides effective resistance to dislocation bowing (Orowan mechanism) below

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300 C. At higher temperatures, dislocation climb is the controlling mechanism and the small oxides/carbides are no longer effective barriers to climb. Processing mode does not significantly alter the as-extruded microstructure, but it does influence strength and strength retention. A combination of low degassing and extrusion temperatures results in superiority with respect to strength and stability.

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *HIGH TEMPERATURE, IRON ALLOYS, NICKEL ALLOYS, MICROSTRUCTURE, HARDNESS, POWDER METALLURGY, MECHANICAL PROPERTIES

IDENTIFIERS: (U) WUAFOSR2308A1, PEG1102F

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 691 20/12

ARIZONA STATE UNIV TEMPE CENTER FOR SOLID STATE ELECTRONICS RESEARCH

(U) Theoretical Studies of Experiments and Applications of Subpicosecond Photoconductivity.

DESCRIPTIVE NOTE: Annual technical rept. no. 1, 1 Sep 84-31 Aug 85

JUN 85 9P

PERSONAL AUTHORS: Grondin, Robert O. ;

CONTRACT NO. AFOSR-84-0280

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-88-0582

UNCLASSIFIED REPORT

ABSTRACT: (U) During the reporting period, the first year of a two year program, progress was made on the development of models of femtosecond photoconductive experiments as used as probes of hot carrier transport in semiconductor devices. In these experiments subpicosecond laser pulses are focused onto a gap in a transmission line with a semiconducting substrate. A voltage wave is then propagated down the line as a result of the photoconductive transient in the gap. During this first year we developed models for the description of the carrier photogeneration process and the ensuing photoconductive transient. Monte Carlo methods were used in both of these models.

DESCRIPTORS: (U) *SEMICONDUCTOR DEVICES, *PHOTOCONDUCTIVITY, *ELECTRONIC SWITCHING, TRANSPORT PROPERTIES, TRANSDUCERS, QUICK REACTION, ELECTRON GAS, HOLES, ELECTRON DEFICIENCIES, LIGHT PULSES, GALLIUM ARSENIDE, MONTE CARLO METHOD

IDENTIFIERS: (U) Femtosecond time, Microstrip transmission lines, WUAFOSR2305C1, PE81102F

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FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Measures of Dependence for Evaluating Information in Censored Models

DESCRIPTIVE NOTE: Technical rept.

JUL 88 22P

PERSONAL AUTHORS: Hollander, Nyles ; Proschan, Frank ; Scoring, James ;

REPORT NO. FSU-STATISTICS-M706, TR-85-180-AFOSR

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0547

UNCLASSIFIED REPORT

ABSTRACT: (U) Measures of information in censored models are developed by adapting measures of dependence between the lifetime variable and the observed variable. Some common notions of bivariate dependence and coefficients of divergence are used to derive these classes of measures. It is shown that most of the measures of bivariate dependence have the fundamental property that as censoring decreases stochastically, the information increases. An exception occurs when dependence is defined in terms of association. Conditions under which the coefficients of divergence enjoy the fundamental property are established. (Author)

DESCRIPTORS: (U) *BIVARIATE ANALYSIS, *MATHEMATICAL MODELS, PROBABILITY DISTRIBUTION FUNCTIONS, PROBABILITY DENSITY FUNCTIONS, RANDOM VARIABLES, COEFFICIENTS, CENSORSHIP

IDENTIFIERS: (U) WUAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 887 12/1

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER
ENGINEERING(U) Research in Adaptive and Decentralized Stochastic
Control

DESCRIPTIVE NOTE: Interim rept. 18 Mar 84-14 Mar 85.

MAY 88 12P

PERSONAL AUTHOR: Marcus, Steven I. ;

CONTRACT NO. AFOSR-84-0089

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-88-0549

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress was made in a number of aspects of stochastic systems. The problem of adaptive control of priority assignment in queueing systems was solved. A distance-measures approach to the problem of approximation and identification of queueing systems was studied. A problem of adaptively controlling a discounted-reward finite state Markov decision process was solved. Major new results were obtained for the problem of adaptive control with incomplete observations. In particular, we have studied in depth a problem in which adaptive control with incomplete observations, in which the state is a finite state Markov process. (Author)

DESCRIPTORS: (U) *STOCHASTIC CONTROL, *ADAPTIVE CONTROL SYSTEMS, *KEY SOLVING, APPROXIMATION/MATHEMATICS), DECENTRALIZATION, OBSERVATION

IDENTIFIERS: (U) QUEUEING SYSTEMS, PE81102F

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STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Laser Physics and Laser Spectroscopy.

DESCRIPTIVE NOTE: Final rept. 18 Feb 84-14 Feb 85.

MAR 88 48P

PERSONAL AUTHORS: Byer, Robert L. ;

CONTRACT NO. F49620-84-G-C021

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-88-0588

UNCLASSIFIED REPORT

ABSTRACT: (U) In its second year of operation, the single crystal fiber growth machine has produced over 400 fibers of a variety of materials, some of which had never before been grown in fiber form. A high speed, high resolution, long working distance diameter measurement system has been constructed and installed on the growth machine. It has enabled the closed loop growth of single crystal fibers possessing diameter stability a factor of four better than the fibers grown without feedback diameter control. The first monolithic single crystal fiber devices, a fiber ruby laser and a sapphire fiber thermometer, have been studied.

DESCRIPTORS: (U) *CRYSTAL GROWTH, *FIBER OPTICS TRANSMISSION LINES, SINGLE CRYSTALS, DRAWING(FORMING), SAPPHIRE, RUBY, YTTRIUM ALUMINUM GARNET, LITHIUM NIOBATES, FABRICATION, FIBER OPTICS, HEATING, LASER BEAMS

IDENTIFIERS: (U) PE81102F, WJAFOSR2301A1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

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WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

ARIZONA UNIV TUCSON

(U) A Bent Cyclopolyallene Anion-Radical (1-Pr2Si)4.

(U) A Bayesian Approach to Quantile and Response Probability Estimation with Applications in Reliability.

85 BP

PERSONAL AUTHORS: Wadsworth, Cynthia L.; West, Robert; Nagai, Yoshino; Watanabe, Mamao; Matsumoto, Hideo; Kikuchi, T.

DESCRIPTIVE NOTE: Technical rept.,

CONTRACT NO. F49620-83-C-0044

AUG 85 24P

PROJECT NO. 2303

PERSONAL AUTHORS: Shaked, Moshe; Singapurwalla, Nozer D.;

TASK NO. 82

CONTRACT NO. AFOSR-84-0205

MONITOR: AFOSR

PROJECT NO. 2304

TR 88-0580

TASK NO. A5

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-88-0352

SUPPLEMENTARY NOTE: Pub. in Chemistry Letters, p1525-1528 1985.

UNCLASSIFIED REPORT

ABSTRACT: (U) The ESR spectra for (1-Pr2Si)4(1tau) and (1-Pr2Si)4(2tau) show two equally-intense splitting constants for alpha-(13)C, indicating that these anion-radicals are bent and not rapidly interconverting. Cyclopolyallenes undergo reaction to anion-radicals in which the unpaired electron is delocalized over the ring. Numerous anion-radicals of four-, five-, and six-membered ring cyclopolyallenes have been investigated by ESR spectroscopy in recent years. When these rings are of the form (R2Si)n(1tau) (with all substituents R identical), in general they show only single values for the alpha-(13)C hyperfine splitting constant (hfsc), as well as for the alpha-(13)C hfsc when it is large enough to be observed. These findings imply that such anion-radicals (R2Si)n(1tau), n = 4 to 6, are either planar or rapidly interconverting on the ESR time scale. An exception to this generalization has now been observed, for octakis(1-propyl)octatetrasilane, 1.

DESCRIPTORS: (U) *SILANES, *POLYMERS, *ANIONS, *CHEMICAL RADICALS, *ELECTRON SPIN RESONANCE, *ELECTRON SPECTROSCOPY, *CYCLIC COMPOUNDS, *BENDING, *SPLITTING, *HYPERFINE STRUCTURE, *REPRINTS

IDENTIFIERS (U) PE81102F

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SUPPLEMENTARY NOTE: Prepared in cooperation with George Washington Univ., Washington, DC.

ABSTRACT: (U) This paper studies a Bayesian approach for the estimation of potency curve which is assumed to be nondecreasing and concave. This is done by assigning a Dirichlet prior to transformations of some unknown parameters. The choice is made of the prior and investigate several aspects of the problem, such as the properties of the posterior distribution as well as a numerical implementation of the suggested procedure. A procedure for estimating the quantiles is also given. Applications in reliability theory are described. The procedure is illustrated numerically via an example from a government laboratory.

DESCRIPTORS: (U) *BAYES THEOREM, *LIFE TESTS, *MATHEMATICAL PREDICTION, *RELIABILITY, *POTENCY, *ACCELERATED TESTING, *DAMAGE ASSESSMENT, *ESTIMATES, *BIOASSAY, *DOSIMETRY

IDENTIFIERS: (U) Dirichlet Process, Quantile estimation, PE81102F, WDAFOSR2304AS

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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AD-A170 430 CONTINUED

SMITHSONIAN ASTROPHYSICAL OBSERVATORY CAMBRIDGE MA

(U) High Resolution Astrophysical Observations Using Speckle Imaging.

DESCRIPTIVE (E) Final rept. 1 Jan 81-31 Dec 85.

APR 86 108P

PERSONAL AUTH: S: Noyes, Robert W.; Nisenson, Peter; Papellio,ostas; Stachnik, Robert V.;

CONTRACT NO. AFOSR-81-0055

PROJECT NO. 2311

TASK NO. A1

MONITOR: A R 1-8-0427

Observatory in this area.

DESCRIPTORS: (U) *SOLAR PHYSICS, *INTERFEROMETRY, *SPECULAR REFLECTION, OPTICAL IMAGES, ASTRONOMICAL PHOTONS, HIGH RESOLUTION, STARS, GROWTH(GENERAL), QUANTUM EFFICIENCY, OPTICAL DETECTORS, IMAGE INTENSIFIERS(ELECTRONICS)

IDENTIFIERS: (U) Speckle Interferometry, PAPA detectors, PAPA(Precision Analog Photon Address), PE81102F, WJAFOSR2311A1

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes progress under a contract to develop a complete astronomical speckle image reconstruction facility and to apply that facility to the solution of astronomical problems. During the course of the contract we have developed the procedures, algorithms, theory and hardware required to perform that function and have made a interpreted astronomical observations of substantial significance. A principal result of the program was development of a photon-counting camera of innovative design, the PAPA detector. Development of this device was in our view, essential to making the speckle process into a useful astronomical tool, since the principal impediment to that circumstance in the past was the necessity for application of photon noise compensating procedures which were difficult if not impossible to calibrate. The photon camera made this procedure necessary and permitted precision image recovery. A result of this effort and the associated algorithm development was an active program of astronomical observation which included investigations into young stellar objects, supergiant structure and measurements of the helium abundance of the early universe. We have also continued research on recovery of high angular resolution images of the solar surface working with scientists at the Sacramento Peak

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DAL: CITE UNIV HALIFAX (NOVA SCOTIA)

(U) Visual Sensitivities and Discriminations and Their Role in Aviation.

Judgements of motion in depth, the results could be explained in terms of only two channels: one for frontal plane motion, and one for pure line-of-sight motion.

DESCRIPTIVE NOTE: Interim rept. Oct 84-Sep 85.

DESCRIPTORS: (U) *VISUAL PERCEPTION, VISION, PILOTS, PERFORMANCE(HUMAN), AERIAL TARGETS, VISUAL TARGETS, TARGET RECOGNITION, DISCRIMINATION, SENSITIVITY, MOTION, CAMOUFLAGE, CANADA

MAR 86 42P

PERSONAL AUTHORS: Regan, David ;

IDENTIFIERS: (U) Visual sensitivity, Target motion, MUAFOSR2313A5, PEB1102F

CONTRACT NO. AFOSR-84-0030

PROJECT NO. 2313

TASK NO. A5

MONITOR AFOSR TR-88-0484

UNCLASSIFIED REPORT

ABSTRACT: (U) A device has been developed (MIDAPT) that tests a subject's ability to track a target's motion in depth. The test has been encouragingly successful in predicting intersubject differences of pilots' flying performance in high-performance jet aircraft and in slow motion. We report evidence that human observers' accuracy of discrimination of differences in size (about 5%) and orientation (about 0.3 deg) is achieved by comparing the outputs of two or more neurons, each of which is sensitive to a rather broad range of sizes and orientations. We suggest that the human visual pathway contains size-opponent and orientation-opponent mechanisms, and that this can explain why subjects easily discriminate size and orientation in spite of the fact that the firing of cortical neurons is affected by all these parameters. We measured subjects' ability to detect a camouflaged object that was visible only when moving and compared these data with similar measurements for stationary objects that were brighter than their surroundings. These findings may be relevant to low-level flight for example in helicopters, where ground features may be virtually indistinguishable except when moving. More clear ability to judge the direction of motion in depth was investigated by measuring the effect of adaptation to different directions of motion in depth for a target viewed with one eye. In contrast to binocular

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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SCIENCE APPLICATIONS INTERNATIONAL CORP LOS ALTOS CA

(U) Studies on High Current Beam Propagation at Reduced Pressure.

DESCRIPTIVE NOTE: Annual rept. 16 Mar 81-30 Nov 84.

JAN 85 121P

PERSONAL AUTHOR: S. Parkinson, E. R.; Keeley, D. A.

REPORT NO. SIC-U-75-PA

CONTRACT NO. F48820-81-C-0012

PROJECT NO. 2301

TASK NO. A

MONITOR: AFOSR
TR-88-0484

UNCLASSIFIED REPORT

ABSTRACT: Hall current effects in the redistribution of plasma currents and possible stability enhancement in electron beams were explored in a range of pressure regimes. Several e.m. algorithms and conductivity models were developed as part of the studies. Substantial effects were found below a low pressure threshold, where nonlocal effects, non-ohmic conductivity, and a highly non-Maxwellian distribution of plasma electron energies were all found to contribute significantly to the magnitude of Hall current phenomena. Several e.m. field algorithms were developed for application to the nonlinear displacement regime. An iterative approach to the solution of the modally expanded field equations was found to yield fast and accurate solutions.

DESCRIPTORS: (U) *PLASMAS(PHYSICS); *HALL EFFECT; *ELECTRON BEAMS; *ELECTRICAL CONDUCTIVITY; *ALGORITHMS; *ELECTROMAGNETIC FIELDS; *ELECTRON DENSITY; *ASYMMETRY

IDENTIFIERS: (U) Larmor frequency, PEB11027

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AD-A170 345 20/2 20/12

COLORADO STATE UNIV FORT COLLINS

(U) Carbon Whisker Study.

DESCRIPTIVE NOTE: Final rept. 1 Mar 84-28 Feb 88.

JUN 86 58P

PERSONAL AUTHOR: Spain, Ian

CONTRACT NO. F48820-84-K-0006

PROJECT NO. 2308

TASK NO. C4

MONITOR: AFOSR
TR-88-0680

UNCLASSIFIED REPORT

ABSTRACT: (U) Preliminary work was carried out on the preparation of filaments prepared by ion bombardment of carbon surfaces. The effects of ion energy, ion dose (time), substrate temperature, type of substrate carbon, and the presence of Fe catalyst were investigated. Models for growth were developed at both CSU and IBM.

DESCRIPTORS: (U) *CARBON; *WHISKERS(CRYSTALS); *PREPARATION; *FILAMENTS; *ION BOMBARDMENT; *SURFACES; *ENERGY; *DOSAGE; *SUBSTRATES; *TEMPERATURE; *IRON; *CATALYSTS; *GRAPHITE; *ION BEAMS; *SPUTTERING; *ATOMS; *ADSORPTION

IDENTIFIERS: (U) PEB1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO EV434M

AD-A170 1 8/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECT ENGINEERING

(U) Reliability Modeling and Analysis of Communication Networks with Dependent Failures.

JAN 83 4P

PERSONAL AUTHORS: Lam, Y. F.; Li, Victor D.

CONTRACT NO F49620-88-C-0071, AFOSR 84 0369

PROJECT NO 2304

TASK NO A5

MONITOR AFOSR TR-88-0351

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in IEEE Transactions on Communications, VCOM-34 n1 p82-84 Jan 86

ABSTRACT (U) This paper presents a new model to study the reliability of communication networks in which link failures are statistically dependent. The approach tries to incorporate and model explicitly the events that cause communication link failures. No conditional probabilities are needed, and so two major difficulties inherent to them, namely an exponential number of conditional probabilities to deal with and a consistency requirement to satisfy, are avoided. For reliability computations, some existing algorithms for finding network reliability can be modified with minor modifications and no significant increase in computational complexity.

DESCRIPTORS: (U) NETWORK ANALYSIS (MANAGEMENT); RELIABILITY (ELECTRONICS); STATISTICAL ANALYSIS; COMMUNICATIONS NETWORKS; ALGORITHMS; REPRINTS

IDENTIFIERS: (U) Communications links. WUAFUSR2304A5, PE01102F

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AD-A170 330 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Estimating Random Integrals from Noisy Observations: Sampling Designs and Their Performance.

DESCRIPTIVE NOTE: Technical rept. Sep 84-Aug 85.

DEC 85 58P

PERSONAL AUTHORS: Buckley, James A.; Cambanis, Stamatis;

REPORT NO. TR-86

CONTRACT NO. F49620-82-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0353

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Wisconsin Univ., Madison, Dept. of Electrical and Computer Engineering. Supersedes AD-A182 928.

ABSTRACT: (U) The problem of estimating a weighted average of a random process from noisy observations at a finite number of sampling points is considered. The performance of sampling designs with optimal or suboptimal, but easily computable, estimator coefficients is studied. Several examples and special cases are studied including additive independent noise, nonlinear distortion with noise, and quantization noise (Author)

DESCRIPTORS: (U) STATISTICAL SAMPLES; ESTIMATES; INTEGRALS; COEFFICIENTS; DISTORTION; QUANTIZATION

IDENTIFIERS: (U) Noisy observation, WUAFOSR2304A5, PE01102F

UNCLASSIFIED

AD-A170 3 5 12/1 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 326 CONTINUED

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Hypoellipticity of the Stochastic Partial Differential Operators

IDENTIFIERS: (U) Hypoellipticity, Semimartingales, WUAFOSR2304A8, PE01102F

DESCRIPTIVE NOTE: Technical rept. Sep 85-Aug 88.

NOV 85 27P

PERSONAL AUTHORS: Ustunel, A. S.

REPORT NO: TR-126

CONTRACT NO: F49620-85-C-0144

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
TR 86-0346

UNCLASSIFIED REPORT

ABSTRACT: (U) In different branches of science one often encounters the so-called stochastic partial differential equations. For example, in quantum physics, transport theory, polymer physics, chemistry, signal detection, etc. These equations are then studied in the context of the particle situation from which they originate. This work aims to provide a start for a systematic treatment of these equations. In fact, it begins with the ideal hypothesis: almost all of the operators are elliptic and the equations are driven on one hand with a drift term and on the other hand, the diffusion term is given by a stochastic integral with respect to a finite dimensional Wiener process. This is typically the case encountered in the filtering of diffusion processes (cf. 2, 3, 10), except here the drift and diffusion operators are not respectively of the second and first order. The coefficients may depend on the whole history, and their coefficients are not necessarily semimartingales.

DESCRIPTIVE NOTE: (U) OPERATORS (MATHEMATICS), PARTIAL DIFFERENTIAL EQUATIONS, STOCHASTIC PROCESSES, INEQUALITIES, DIFFUSION, CALCULUS

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 317 4/2

ILLINOIS STATE WATER SURVEY DIV URBANA

(U) A Theoretical Framework for Examining Geographical Variability in the Microphysical Mechanisms of Precipitation Development.

DESCRIPTIVE NOTE: Final rept. 18 Jan 82-14 Jan 88.

JUN 88 101P

PERSONAL ATTORNS: Johnson, David B. ;

CONTRACT NO: AFOSR-82-0018

PROJECT NO: 2310

TASK NO: A2

MONITOR: AFOSR
TR 86-0484

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal of this study was to identify and evaluate the environmental or microphysical parameters that control the efficiency of the various mechanisms of precipitation development. Such evaluations can then be used as the basis for studying, or even predicting, the effect of geographical or climatological differences between regions on the microphysical mechanisms of precipitation development. This study included work on warm rain initiation and development, ice multiplication, snowflake aggregation, and the growth of graupel by collection of supercooled water droplets. During the first year of the study, work concentrated on the warm cloud studies and began on the investigation of snowflake aggregation. With the extension of the study into a second year, additional investigations were made on snowflake aggregation and preliminary investigations were begun to extend these studies into mixed phase (riming) precipitation. The studies of riming and graupel development were quite successful and indicated that the studies of warm rain initiation and development could be extended to include mixed-phase precipitation development. In general, the study identified a number of key parameters that control the microphysical development of precipitation. The two primary parameters that need to be measured on a climatological basis are cloud base

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temperature and cloud droplet concentration. Other key parameters include the degree of entrainment and stability of the environment.

DESCRIPTORS: (U) *PRECIPITATION, *ATMOSPHERIC PHYSICS, *GEOGRAPHIC AREAS, *CLIMATOLOGY, RAIN, ICE FORMATION, SNOW, WATER, DROPS, SUPERCOOLING, CLOUDS, TEMPERATURE, CONCENTRATION (COMPOSITION), AGGLOMERATES

IDENTIFIERS: (U) SNOW flakes, PE81102F, WUAFDSR2310A2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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WEA C BRIDGE MA

AD-A170 318 CONTINUED

WAVE PROPAGATION, DYNAMIC RANGE, REFLECTIVITY, JOINTS, DISPERSION RELATIONS

(U) Wave Propagation and Dynamics of Lattice Structures.

DESCRIPTIVE NOTE: Final rept. 1 Apr 83-30 Sep 85.

OCT 85 27P

IDENTIFIERS: (U) LSS(Large Space Structures),
NDE(Nondestructive Evaluation), Shear Waves, Flexural
waves, Longitudinal waves, Lattice structures, Periodic
structures, PE81102F, WUAF05R2307B1

PERSONAL MONORS: Williams, James M., Jr;

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2307

TASK NO. 81

MONITOR: AFOSR
TR-88-0489

UNCLASSIFIED REPORT

ABSTRACT (U) Many papers and reports have been written on the concepts, design and potential uses of lattice structures in outer space. Such structures include large arrays of solar power systems and habitable stations for support of space colonies. Currently, both deployable and erect concepts are being investigated for the application of lattice structures. Also, investigations of size considerations indicate that small antennas ranging from tens of meters in span to solar power collectors ranging up to several thousand meters have been proposed. Such structural sizes along with stringent operational requirements will require considerable information of dynamics, control, materials, nondestructive evaluation (NDE), environmental effects and wave propagation relating to their design and analysis. Much has been written on the theoretical aspects of the control of such structures. Also, a large number of vibration analyses have been undertaken. However, despite a distinct recognition of the importance of wave propagation in many of the control, vibration and NDE investigations, virtually nothing can be found on wave propagation in large space structures (LSS). The goals of this program were to initiate and to pursue the development of several aspects of wave propagation analyses in LSS. (Author)

DESCRIPTORS: (U) *SELF SUPPORTING STRUCTURES, VIBRATION,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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ROCKEFELLER UNIV NEW YORK

(U) Intracerebral Injection of Synapsin I or Calcium/Calmodulin-Dependent Protein Kinase II Alters Neurotransmitter Release at the Squid Giant Synapse

DESCRIPTIVE NOTE: Rept. 1 Mar 88-28 Feb 88.

MAY 83 8P

PERSONAL AUTHOR: Llinas, R.; Modulinas, T. L.; Leonard, C. S. J.; Greengard, P.

CONTRACT NO. AFOSR-84-0088

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
IR-88-0418

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the National Academy of Science, U.S.A., V62 p3035-3039 May 85.

ABSTRACT (U) Synapsin I and calcium/calmodulin-dependent protein kinase II were pressure-injected into the presynaptic digit of the squid giant synapse to test directly the possible regulation of neurotransmitter release by these substances. Neurotransmitter release was determined by measuring the amplitude, rate of rise, and latency of the postsynaptic potential generated in response to presynaptic depolarizing steps under voltage clamp conditions. Injection of dephosphosynapsin I decreased the amplitude and rate of rise of the postsynaptic potential, whereas injection of either phosphosynapsin I or heat-treated dephosphosynapsin I was without effect. Conversely, injection of calcium/calmodulin-dependent protein kinase II, which phosphorylates synapsin I on site II, increased the rate of rise and amplitude and decreased the latency of the postsynaptic potential. The effects of these proteins were observed without any detectable change in the initial phase of the presynaptic calcium current. A synapsin I-like protein and calcium/calmodulin-dependent protein kinase II were demonstrated by biochemical and

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immunochemical techniques to be present in squid nervous tissue. The data support the hypothesis that synapsin I regulates the availability of synaptic vesicles for release.

DESCRIPTORS: (U) •NEUROCHEMICAL TRANSMISSION, •SYNAPSE, •PHOSPHORUS TRANSFERASES, PROTEINS, INJECTION, CONTROL, RELEASE, CALCIUM, PHOSPHORYLATION, DISSOCIATION, ELECTROPHYSIOLOGY, CEPHALOPODA, REPRINTS

IDENTIFIERS: (U) •Kinases, Calmodulin Squids, PE8102P, WJAFOSR2312A2

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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AD-A170 303 CONTINUED

NORTH CAROLINA UNIV AT CHAPEL HILL CURRICULUM IN
OPERATIONS RESEARCH AND SYSTEMS ANALYSIS

IDENTIFIERS: (U) Markov chains, PG01102F

(U) Queuing Analysis of Fault-Tolerant Computer Systems

DESCRIPTIVE NOTE: Technical rept..

DEC 85 25P

PERSONAL AUTHORS: Nicola, V. P.; Kulkarni, V. G.; Trivedi, K. S.;

REPORT NO: UNC/ORSR/TR-88-10

CONTRACT NO: DAAG29-84-1-0048, AFOSR-84-0132

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
TR-88-0388

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-MCS83-0200

ABSTRACT: (U) This paper analyzes a fault-tolerant computer system. The failure/repair behavior of the system is modeled by an irreducible continuous-time Markov chain. Jobs arrive in a Poisson fashion to the system and are serviced according to an FCFS discipline. A failure may cause the loss of the work already done on the job in service, if any; in this case the interrupted job is created as soon as the system is ready to deliver service in addition to the delays due to failures and repairs. Jobs suffer delays due to queuing. The authors present a queuing analysis of fault-tolerant systems and study the steady-state behavior of the number of jobs in the system. As a numerical example, they consider a system with two processors subject to failures and repairs. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *SYSTEMS ANALYSIS, *QUEUEING THEORY, FAILURE(ELECTRONICS), REPAIR, STEADY STATE, DELAY, JOBS

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PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

IDENTIFIERS: (U) WUAFOSR2304AS, P181102F

(U) Asymptotic Distributions of Functions of the Eigenvalues of the Sample Covariance Matrix and Canonical Correlation Matrix in Multivariate Time Series.

DESCRIPTION NOTE: Technical rept..

MAR 86 35P

PERSONAL AUTHOR: Taniguchi, M.; Krishnan, P. R.;

REPORT NO TR-86-08

CONTRACT NO. F49620-85-C-0008, N00014-85-K-0292

PROJECT NO 2304

TASK NO. 45

MONITOR: AOSR
TR 86-0357

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper discusses the asymptotic distributions of eigenvalues of sample covariance matrices of multivariate time series since the eigenvalues play a fundamental role in multivariate problems. Section 2 gives the limiting distribution of eigenvalues of sample covariance matrices for non-Gaussian linear vector processes. Further Section 3, derives asymptotic expansions of certain functions of eigenvalues of covariance matrix for multivariate Gaussian stationary processes, and discuss their applications for time series principal component analysis. In Section 4 the author gives the asymptotic expansions of certain functions of canonical correlation matrix for multivariate Gaussian stationary processes, and discusses some asymptotic properties of a test statistic for canonical correlations.

DESCRIPTORS: (U) *EIGENVALUES, *ASYMPTOTIC SERIES, *DISTRIBUTION FUNCTIONS, TIME SERIES ANALYSIS, *MULTIVARIATE ANALYSIS, SIGNAL PROCESSING, APPLIED MATHEMATICS, COVARIANCE, MATRICES(MATHEMATICS), STATIONARY

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NORTH CAROLINA UNIV AT CHAPEL HILL CURRICULUM IN
OPERATIONAL RESEARCH AND SYSTEMS ANALYSIS

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Markov Algorithms for Computing the Reliability of
Staged networks.

(U) The Multivariate Hazard Construction.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Technical rept..

APR 86 28P

FEB 85 44P

PERSONAL AUTHORS: Cheng, R. C. ;

PERSONAL AUTHORS: Shaked, Moshe ; Shanthikumar, J. G. ;

REPORT NO. WAC/QRSA/TR-86/8

CONTRACT NO. AFOSR-84-0208

CONTRACT NO. AFOSR-84-0140

PROJECT NO. 2307

PROJECT NO. 2304

TASK NO. A5

TASK NO. A5

MONITOR: 2307R

MONITOR: AFOSR
TR-88-0350

18 88-0438

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Certain commonly occurring types of network, whether directed or undirected, exhibit a staged structure. Two algorithms, based on node partitioning, are presented which take advantage of such structure and which use a Markov transition-probability form of recursion. The algorithm for directed networks is related to the Markov chain formulation of Bailey and Kulkarni, but for directed networks a more detailed form of state decomposition is used related to one suggested by Rosenthal. The computational advantage of the algorithms are discussed and some numerical results presented. (Author)

DESCRIPTORS: (U) *ALGORITHMS, *NETWORK ANALYSIS (MANAGEMENT), NODES, RELIABILITY, COMPUTATIONS, RECURSIVE FUNCTIONS

IDENTIFIERS: (U) Node partition, Markov chains, WUAFOSR2 745, PE81102F

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ABSTRACT: (U) A new representation, called the total hazard construction, of dependent random variables by means of independent exponential random variables is introduced. Conditions which imply association of nonnegative random variables are found using this construction. Furthermore, new conditions which imply stochastic ordering between two nonnegative random vectors are obtained. These strengthen previous results of the authors. Further applications in reliability theory and in simulation are indicated. (Author)

DESCRIPTORS: (U) *RANDOM VARIABLES, MULTIVARIATE ANALYSIS, TRANSFORMATIONS (MATHEMATICS), DISTRIBUTION, EXPONENTIAL FUNCTIONS, STOCHASTIC PROCESSES, RELIABILITY, SIMULATION

IDENTIFIERS: (U) Hazard construction, WUAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 285 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) The Total Hazard Construction, Antithetic Variates and Simulation of Stochastic Systems.

DESCRIPTIVE NOTE: Technical rept.,

AUG 85 24P

PERSONAL AUTHORS: Shaked, Moshe ; Shanthikumar, J. G. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0401

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with California Univ., Berkeley, School of Business Administration.

ABSTRACT: (U) This paper combines recent developments in the use of generation of dependent random variables with the advantages of the use of common and antithetic random numbers. This combination yields new efficient methods for simulating complicated stochastic quantities by simulation. Some theoretical and practical aspects of use of antithetic and common random numbers for variance reduction while using the total hazard construction are given. A proof of their optimality in estimating the expected value of the response sum or the response difference of functions of vector arguments with dependent components is presented. Some numerical examples illustrate the theory. (Author)

DESCRIPTORS: (U) *RANDOM NUMBER GENERATORS, *RANDOM VARIATION, *SIMULATION, STOCHASTIC PROCESSES, MONOTONE FUNCTIONS, MULTIVARIATE ANALYSIS, ESTIMATES

IDENTIFIERS: (U) Variance reduction, PE81102F, NWA 2304A5

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MASSACHUSETTS UNIV AMHERST DEPT OF MATHEMATICS AND STATISTICS

(U) Some Remarks on the Asymptotic Behaviour of the Lengths of $1/n$ Collision Resolution Interval. Revision.

DESCRIPTIVE NOTE: Technical rept.,

DEC 85 12P

PERSONAL AUTHORS: Rosenkrantz, Walter A. ;

CONTRACT NO. AFOSR-82-0187

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0347

UNCLASSIFIED REPORT

ABSTRACT: (U) An operator method is presented for obtaining upper and lower bounds for the expected length of a collision resolution interval for various protocols. The method is elementary in that it circumvents the intricate and ingenious complex variable methods of Fayolle, Flajolet and Hofri. The method can be applied to computing bounds for the delay. A conjecture of Massey's and some its implications, as well as some open questions of more than routine interest, are also discussed.

DESCRIPTORS: (U) *COMMUNICATION AND RADIO SYSTEMS, *INFORMATION THEORY, ASYMPTOTIC SERIES, ALGORITHMS, COMPLEX VARIABLES, CHANNELS, BOUNDARIES, OPERATORS (MATHEMATICS)

IDENTIFIERS: (U) Channel access algorithms, Collision resolution algorithm, PE81102F, WJAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 258 12/1

AD-A170 258 CONTINUED

NORTH ATLANTA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

DESCRIPTORS: (U) *MARKOV PROCESSES, RANDOM VARIABLES, FUNCTIONS(MATHEMATICS), PATHS, ELEMENTARY PARTICLES, INTEGRALS, QUANTUM THEORY

(U) A Central Limit Theorem for Markov Paths and Some Properties of Gaussian Random Fields.

IDENTIFIERS: (U) *Central limit theorem, Gaussian processes

DESCRIPTORS NOTE: Technical rept. Sep 85-Aug 88.

FEB 86 62P

PERSONAL AUTHORS: Adler, Robert J.; Epstein, R. J.

REPORT NO. TR-134

CONTRACT NO. F49620-85-C-0114

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0380

UNCLASSIFIED REPORT

ABSTRACT: (U) Our primary aim is to 'build' versions of generalized Gaussian processes from simple, elementary components in such a way that as many as possible of the esoteric properties of these elusive objects become intuitive. For generalized Gaussian processes, or fields, indexed by smooth functions or measures on R^d , our building blocks will be simple Markov processes whose state space is R^d . Roughly speaking, by summing functions of the local times of the Markov processes we shall obtain a central limit theorem type of result, obtain the Gaussian field. This central limit result, together with related results indicating how additive functionals of the Markov processes generate additive functionals of the field, yield considerable insight into properties of generalized Gaussian processes such as Markovianess, self-similarity, 'locality' of functionals, etc. Although the paper is comprised primarily of new results, and despite the fact that the subject matter is somewhat esoteric, our aim is primarily didactic and expository - we want to try to initiate the uninitiated into some of the mysteries of generalized processes via an easily understood model. (Author)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 244 4/2

PHYSICAL DYNAMICS INC BELLEVUE WA

(U) Nonlinear Internal Gravity Wave Propagation,
Saturation, and Absorption in the Atmosphere.

DESCRIPTORS: NOTE: Final rept. 10 Feb 83-2 Sep 88.

APR 88 23P

PERSONAL SOURCES: Dunkerton, Timothy J. ;

REPORT NO PD-NW-88 343R

CONTRACT NO F48620-83-C-0061, F48620-85-C-0032

PROJECT NO 2310

TASK NO. A1

MONITOR: AFOSR
IN-88-0480

UNCLASSIFIED REPORT

ABSTRACT (U) Numerical and theoretical studies of internal gravity waves have been performed to understand the role of convective instabilities in nonlinear, large amplitude gravity waves; the effects of saturation and self-organization on transient gravity wave mean flow interaction; the role of local convective instabilities in producing turbulent modifications of potential temperature and trace constituents in breaking gravity waves; and the propagation and refraction of inertial and noninertial gravity waves through observed middle atmosphere wind fields. Simulations with a two dimensional, nonhydrostatic gravity wave model indicate that corrective adjustment in unstable gravity waves results in a mean flow modification closely approximated by the saturation theory in cases where the incident wave field is nearly monochromatic. Convection also limits and potentially prevents the evolution to a reflecting noncritical layer, even when the incident wave field is not monochromatic. Some critical layer distortion is observed due to self acceleration in transient gravity waves. Localization of turbulence in a convectively unstable gravity wave can greatly reduce the mixing of heat and trace constituents and implies a large turbulent Prandtl number. Significant lateral movement

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and refraction of gravity wave rays is observed for inertia gravity waves in realistic wintertime flows. A formula is derived for the onset of dynamical instability in inertia-gravity waves, having a lower threshold than the corresponding amplitude required for convective instability.

DESCRIPTORS: (U) *GRAVITY WAVES, *CONVECTION(ATMOSPHERIC)
*PRANDTL NUMBER, INTERNAL WAVES, MOMENTUM TRANSFER, TWO
DIMENSIONAL, RAY TRACING, WINTER

IDENTIFIERS: (U) WKB approximation, Eliassen Palm
Theorem, PE81102F, WJAFDSR2310A1

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PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Surface Chemistry and Structural Effects in the Stress Corrosion of Glass and Ceramic Materials.

DESCRIPTIVE NO. Final rept. Jan 82-Jan 88.

MAR 88 102P

PERSONAL AUTH Pantano, Carlo G.; Macholsky, John J. ;

CONTRACT NO. AFOSR-82-0013

PROJECT NO. 203

TASK NO. A3

MONITOR: AFOSR TR 83 0502

UNCLASSIFIED REPORT

ABSTRACT: (U) The fracture behavior of glasses in the system $\text{Na}_2\text{O}-(13-x)\text{SiO}_2$ ($x=0.0, 0.2, 0.4, 0.6, 0.8$ and 1.0) has been evaluated, and independently, their chemical composition in aqueous solutions was studied. The changes in the n -parameter upon the $\text{Al}_2\text{O}_3/\text{SiO}_2$ ratio, were intended to influence the network structure of the glass. The V-K sub I diagrams were obtained using the constant moment double cantilever beam technique in a wide variety of environments. The n -parameter in Region I was found to be independent of x , whereas the presence of velocity plateaus and thresholds was shown to be very dependent upon the composition of the aqueous environment. This behavior was attributed to interactions between the fracture surfaces behind the crack-tip. The dependence of the n -parameter upon the bulk composition and structure of the glasses was correlated with the elastic properties of the glass, i.e., the value of the n -parameter did not depend directly upon the corresponding corrosion resistance of the glass. Finally, the static fatigue limit, at least in the case of the $\text{Na}_2\text{O}-35\text{SiO}_2$ ($x=0.0$) glass, could be explained in terms of crack-healing rather than crack-blunting. Although, this study of fracture within a systematic compositional series of glasses led to critical assessments of the existing models for environment-dependent crack growth in glass.

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The results of comparable-although less extensive studies on fluorozirconate glasses and silica sol/gel materials are also reported.

DESCRIPTORS: (U) *GLASS, *CERAMIC MATERIALS, *STRESS CORROSION, SURFACE CHEMISTRY, MOLECULAR STRUCTURE, SILICA GLASS, SODIUM OXIDES, ALUMINUM OXIDES, SOLUTIONS(MIXTURES), FRACTURE(MECHANICS), ELASTIC PROPERTIES, STATIC LOADS, FATIGUE(MECHANICS), CRACK PROPAGATION, VELOCITY, PLATEAUS, THRESHOLD EFFECTS, ZIRCONATES

IDENTIFIERS: (U) PE01102F, WJAFOSR2303A3

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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DUKE UNIVERSITY DURHAM NC DEPT OF COMPUTER SCIENCE

(U) A Hierarchical Combinatorial-Markov Method of Solving Complex Reliability Models.

DESCRIPTIVE NOTE: Technical rept..

83 28P

PERSONAL AUTHORS: Sahner, Robin A. ; Trivedi, Kishor S. ;

REPORT NO. CS-1988-14

CONTRACT NO. DAAG28-84-C-0045, AFOSR-84-0132

PROJECT NO. 2304

TASK NO. A5

MONITOR AFOSR
TR-88-0383

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Gould
CSD, Urbana, IL.

ABSTRACT (U) The design process for complex, fault-tolerant systems needs to be supported by cost-effective and accurate techniques for design evaluation in order to facilitate trade-off analysis. Combinatorial models such as fault trees and reliability block diagrams are efficient in both specification and evaluation of system models. But it is difficult if not impossible to allow for those types of dependency (such as repair dependency and near-coincident-fault type dependency), transient and intermittent faults, standby systems with warm-up times, and so forth. Markov models can capture such interesting system behavior. However, the size of a Markov model for the evaluation of such a system may grow exponentially with the number of components in the system. One approach that has been successful in connection with ultrahigh reliability modeling is called behavioral decomposition. This approach is based on the decomposition of the model along temporal lines. Separately analyzing a fast submodel (corresponding to fault error-handling behavior) and a slow submodel (corresponding to the fault-occurrence behavior). In

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practical problems, however, the fault-occurrence behavior itself gives rise to a large number of states in the underlying stochastic process. This paper presents an approach for avoiding the large state space problem in the fault-occurrence model while retaining the benefits of behavioral decomposition. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING. *SYSTEMS ENGINEERING. *RELIABILITY(ELECTRONICS). COST EFFECTIVENESS. TRADE OFF ANALYSIS. COMBINATORIAL ANALYSIS. MATHEMATICAL MODELS. MARKOV PROCESSES

IDENTIFIERS: (U) SHARPE(Symbolic Hierarchical Automated Reliability and Performance Evaluator). SHARPE computer program

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 228 12/1

MASSACHUSETTS UNIV AMHERST DEPT OF MATHEMATICS AND STATISTICS

(U) Approximate Counting. A Martingale Approach.

DESCRIPTIVE NOTE: Interim rept. 15 May 85-14 May 86.

FEB 85 14P

PERSONAL AUTHORS: Rosenkrantz, Walter A. ;

CONTRACT NO. AFOSR-82-0187

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0377

UNCLASSIFIED REPORT

ABSTRACT (U) Approximate counting is a probabilistic algorithm for keeping track to large numbers of events by means of counters of limited range. In this paper we present an analysis of this algorithm using the elementary theory of martingales. The methods are also applied to the analysis of the counter which occurs in the essential back off protocol. (Author)

DESCRIPTORS (U) COUNTING METHODS, ALGORITHMS, PROBABILITY, RANDOM VARIABLES, ESTIMATES, INEQUALITIES

IDENTIFIERS (U) Approximate counting, Martingales, Markov chains, PE81102F, WCAAFOSR2304A5

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UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES

(U) A Precision Laser Spectrometer System.

DESCRIPTIVE NOTE: Final rept. 15 Aug 83-31 Aug 84.

APR 88 13P

PERSONAL AUTHORS: Gundersen, Martin ; Reiser, Hanna ; Wittig, Curt ;

CONTRACT NO. AFOSR-83-0308

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-88-0358

UNCLASSIFIED REPORT

ABSTRACT: (U) An excimer laser based dye laser system has been purchased and integrated into experiments which involve DOD funding. The laser system is currently used in several important experiments: photodissociation of aliphatic nitro and nitroso alkanes, and halogen cyanides; bimolecular reactions of C2H, and cluster reactions of H with CO2; laser induced fluorescence studies in pulsed power switches such as thyristors. The laser system has already become an integral part of these studies, and will be used in other funded research in the future.

DESCRIPTORS: (U) EXCIMER LASERS, REACTION KINETICS, PHOTODISSOCIATION, LASER INDUCED FLUORESCENCE, THYRISTORS, ALIPHATIC HYDROCARBONS, NITRO RADICALS, NITROSO COMPOUNDS, ALKANES, HALOGENS, CYANIDES, ELECTRONIC SWITCHES, PHOTOLYSIS, CHEMILUMINESCENCE

IDENTIFIERS: (U) Aliphatic nitro, Nitroso alkanes, Halogen cyanides, WIAFOSR2301A7, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 14 14/8 20/6
 PERNS CIA STATE UNIV UNIVERSITY PARK DEPT OF
 ELECTRONIC ENGINEERING
 (U) White Light Optical Information Processing and
 Modulation
 DESCRIP: NOTE: Annual rept. 18 Mar 84-14 May 85.
 AD-A170 224 CONTINUED
 DESCRIPTORS: (U) *HOLOGRAPHY, *IMAGE PROCESSING, *WHITE
 LIGHT, OPTICAL PROCESSING, FOURIER TRANSFORMATION,
 SPLITTING, MAGNETOOPTICS, COLORS, NOISE REDUCTION, SPEECH
 ANALYSIS, REAL TIME, SIGNAL PROCESSING, LIGHT MODULATORS,
 SPATIAL FILTERING
 IDENTIFIERS: (U) Speech spectrograms, WJAFOSR230581,
 PEB1102P

AD-A170 57P

PERSONAL AUTHORS: Yu, Francis T. ;

CONTRACT NO: AFOSR-83-0140

PROJECT NO: 2305

TASK NO: 81

MONITOR: AFOSR
 TR-86-0483

UNCLASSIFIED REPORT

ABSTRACT (U) Explored is the possibility of using
 natural solar light for Holographic image processing. The
 advantage of this technique is the processing system does
 not require to carry its own light source. It is very
 suitable for spaceborne and satellite application.
 Device is a technique of measuring the noise
 performance of a white light processor. A programmable
 Magneto-optic spatial light modulator is applied to white
 light image processing. The MDSLW responds to polarized
 light which offers the advantage of color coding signal
 processing. The most important aspect of this device must
 be the programmability, for which a real time
 programmable optical processor can be realized in
 practice. A technique is developed for generating a
 four-transverse hologram with a white light source.
 This technique is very suitable for reconstructing color
 holograms with white-light processing. So is a
 technique of generating a spatial frequency color coded
 spectrogram with a white light optical system
 This method not only offers a low cost alternative but
 also eliminated the complicated programming procedure
 with its counterpart. A spatial encoding technique is
 developed for color image retrieval so that the annoying
 moire fringes can be eliminated.

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 223 12/1

ARIZONA IV TUCSON DEPT OF MATHEMATICS

(U) On the First Failure Time of Dependent Multicomponent Reliability Systems

DESCRIPTIVE NOTE: Technical rept.

DEC 85 30P

PERSONAL AUTHORS: Shaked, Moshe ; Shanthikumar, J. G. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

TASK NO. 25

MONITOR: AFOSR
TR-88-0355

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper are considered multicomponent reliability systems where component failure times are dependent. Repair completion rates depend on the state of the system. Repair repair durations of the other components. This is a generalization of a model of Ross (1984). Sufficient conditions on the sets of rates which imply stochastic ordering between first failure times of two such systems are found. Sufficient conditions on the rates which imply that the first failure time of such a system is better than used (MBU) are given. Some results of Barlow and Proschan (1978), Chiang and Niu (1980) and Ross (1978) are obtained as special cases. A counterexample to an apparently stronger result of Miller (1978) is also given. Further results and a discussion are included. (Author)

DESCRIPTORS (U) MATHEMATICAL ANALYSIS, FAILURE, RELIABILITY, REPAIR, STOCHASTIC PROCESSES, MULTIVARIATE ANALYSIS, RANDOM VARIABLES

IDENTIFIERS (U) DMR5(Dependent Multicomponent Reliability Systems), WUAFOSR2304A5, PB81102F

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SOUTHWEST RESEARCH INST SAN ANTONIO TX

(U) Study of the Influence of Metallurgical Factors on Fatigue and Fracture of Aerospace Structural Materials.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Dec 85.

FEB 86 34P

PERSONAL AUTHORS: Lankford, James ; Leverant, Gerald R. ; Davidson, David L. ; Chan, Kwei S. ;

CONTRACT NO. F49620-83-C-0054

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-88-0493

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results of a two-phase study involving (1) experimental characterization and analytical modeling of fatigue crack tip micromechanics in aerospace structural (Al and Ti) alloys, and (2) identification and modeling of key factors controlling subcritical crack growth and unstable fracture in single crystal nickel-base superalloys. Fatigue crack growth at near-threshold rates has been modeled using micro-structurally-controlled micromechanical crack tip parameters. The model is based on the concept of crack opening by means of local slip lines whose length and dislocation density are controlled by the alloy microstructure. Crack tip opening displacement, crack tip strain, and the increment of crack advance are micromechanical parameters which depend on the number, spacing, and orientation of the slip lines. Fatigue crack growth mechanisms in Ni-base superalloy single crystals were examined as a function of crystallographic orientation, stress state and slip character. Using compact-tension and tubular specimens, fatigue crack growth in Mar-M200 single crystals of various crystallographic orientations was determined in both unidirectional and multiaxial cyclic loads, at temperatures where the slip character was either localized (25 C) or homogeneous (980 C).

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AD-A170 217 12/1

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

(U) Interaction of Diffusion and Boundary Conditions.

JUL 88 37P

PERSONAL AUTHORS: Hale, Jack K.; Rocha, Carlos;

REPORT NO. LCOS-85-24

CONTRACT NO. DAAG28-83-K-0028, AFOSR-84-0378

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-88-0372

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-DMS85-07058.

ABSTRACT: (U) For systems of reaction diffusions, the existence and behavior of the solutions on the compact attractor are discussed for large diffusion coefficients and boundary conditions which can vary from Neumann to Dirichlet conditions.

DESCRIPTORS: (U) *PARTIAL DIFFERENTIAL EQUATIONS, *DIFFUSION, *SOLUTIONS(GENERAL), EIGENVECTORS, LYAPUNOV FUNCTIONS

IDENTIFIERS: (U) Dirichlet problem, Neumann problem, Bifurcation theory, WUAFOSR2304A1, PE81102F

DESCRIPTO (U) *ALUMINUM ALLOYS, *TITANIUM ALLOYS, *METALL *COMPOSITE STRUCTURES, NICKEL ALLOYS, SUPERAIRFRAMES, AEROSPACE SYSTEMS, CRACK PROPAGATION, FRACTURE(MECHANICS), CRYSTALLOGRAPHY, GROWTH, MICROSTRUCTURE, FATIGUE(MECHANICS), CRACKING, COMPOSITE MATERIALS, STRUCTURAL PROPERT

IDENTIFIE (U) Aerospace structures, Crack tip, LPN-SWRI-74 WUAFOSR2304A1, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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AE-A170 211 CONTINUED

CITY OF NEW YORK ULTRAFAST SPECTROSCOPY AND LASER LAB

(U) Spectroscopy Investigated by Time Resolved Spectroscopy Using Femtosecond and Picosecond Laser Technology

DESCRIPTION NOTE: Final rept. 1 Dec 84-30 Nov 85.

MAR 85 19P

PERSONAL AUTHORS: Alfano, Robert R. ;

REPORT NO. 447215

CONTRACT NO. AFOSR-85-0013

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-85-0500

UNCLASSIFIED REPORT

ABSTRACT (U) Four major accomplishments have been achieved to help further the development of faster photoconductive and electronic devices. 1. We have shown theoretically and experimentally how one can determine accurately one of the most important parameters in electronic devices: the bandgap discontinuity in valence and conduction bands at the heterojunction from the photoluminescence measurements for ultrathin wells in the range of 15 to 80 Å for GaAs/AlGaAs and GaInAs/AlInAs structures. 2. A model was developed using the electron dephasing to describe the much slower carrier optical phonon relaxation rate measurements in 2D as compared to 3D. 3. The valence and conduction band deformation potentials were separately determined for the first time in semi-magnetic semiconductor alloys of CdTe and HgTe from the shift in photoluminescence spectra versus strain. The valence band deformation potential of wurtzite crystals is much larger compared to the one in zinc blende. This technique measures separately the value of valence and conduction band deformation potentials instead of the difference between them. 4. The direct picosecond spin dephasing time and degree of spin alignment of photoexcited electrons in semi-magnetic

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semiconductor alloys of Cd(1-x)Mn(x)Se was measured. The fast dephasing times arise from the spin exchange between free carriers and the localized Mn²⁺ ions.

DESCRIPTORS: (U) *SEMICONDUCTOR DEVICES, *HETEROJUNCTIONS, *LASER PUMPING, OPTICAL PROPERTIES, LIGHT PULSES, GALLIUM COMPOUNDS, INDIUM COMPOUNDS, ALUMINUM GALLIUM ARSENIDE, CADMIUM SELENIDES, POLARIZATION, SPIN STATES, MAGNETIC MATERIALS, MOLECULAR STRUCTURE, PHONONS, PHOTOLUMINESCENCE

IDENTIFIERS: (U) Quantum wells, Aluminum indium arsenide, Gallium indium arsenide, Cadmium manganese selenide, Wurtzite, Fem to second time, Picosecond time, WUAFOSR2305C1, PE81102F

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DTIC REPORT BIBLIOGRAPHY

AD-A170 210 11/4 20/11

GEORGIA INST OF TECH ATLANTA SCHOOL OF CIVIL ENGINEERING

(U) Failure Processes in Advanced Composite Structures.

DESCRIPTIVE NOTE: Final rept. 1 Jul 78-15 Nov 80.

JAN 81 28P

PERSONAL AUTHORS: Rehfield, L. W.; Atturi, S. M.;

CONTRACT NO: F49620-78-C-0088

PROJECT NO: 2307

TASK NO: B1

MONITOR: AFOSR
TR-82-0114

UNCLASSIFIED REPORT

ABSTRACT (U) A new assumed stress hybrid finite element method based on a complementary energy principle, has been developed for stress as well as fracture analyses of angle-ply laminates. The loading cases can include triaxial as well as general bending loads. In this method, the three-dimensional stress-state (including the transverse shear and normal stresses) in each lamina is accounted for; the mixed-mode stress and strain singularities near the crack front, the intensities of which vary within each ply in the thickness direction of the laminate, are embedded in special elements near the crack front.

DESCRIPTORS: (U) *STRESS ANALYSIS, *COMPOSITE STRUCTURES, *LAMINATES, *FRACTURE (MECHANICS), *CRACKS, *ANGLES, *FINITE ELEMENT ANALYSIS, *THREE DIMENSIONAL, *SHEAR STRESSES, *DIRECT, *BENDING STRESS, *ENERGY, *STRESS STRAIN RELATIONS, *THICKNESS, *EPOXY COMPOSITES, *TAPES, *METALS, *HOLES (VINGS), *STRUCTURAL MEMBERS, *HYBRID SIMULATION

IDENTIFIERS: (U) Complementary energy principles, Angle ply laminates, Metallic laminates, WJAFOSR230781, PE811

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SEARCH CONTROL NO. EVN34M

AD-A170 208 12/1 14/4

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) On Prediction Intervals for Future Observations from the Inverse Gaussian Distribution.

DESCRIPTIVE NOTE: Interim technical rept.,

JAN 80 12P

PERSONAL AUTHORS: Padgett, W. J.; Tsol, S. H.;

REPORT NO: TR-109, 82F28-1

CONTRACT NO: AFOSR-84-0180

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
TR-88-0412

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of predicting, on the basis of an observed sample of size n from an inverse Gaussian distribution, a future observation from the same distribution is discussed. Two prediction intervals that have been proposed in the literature, one of which is an approximate prediction interval, are compared using Monte Carlo simulations. The results indicate that in many of the simulated cases the approximate prediction interval is superior with respect to larger estimated coverage probabilities and smaller estimated mean lengths. This is true in particular for n at least 18 and for 95% and 99%.

DESCRIPTORS: (U) *LIFE TESTS, *MATHEMATICAL PREDICTION, *RELIABILITY, *QUALITY CONTROL, *PROBABILITY DENSITY FUNCTIONS, *GAUSSIAN QUADRATURE, *MONTE CARLO METHOD, *STATISTICAL SAMPLES

IDENTIFIERS: (U) Inverse problems, WJAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 204 20/7

MISSION: SEARCH COMP ALBUQUERQUE NM

(U) Beam Propagation Experimental Study.

DESCRIPT: DATE: Annual rept.,

MAR 82 380P

PERSONAL: SRS: Ekdahl, C. A. ;

REPORT NO: AMRC-R-382

CONTRACT NO: F49620-81-C-0018

PROJECT NO: 2301

TASK NO: A7

MONITOR: JCSR
86-0803

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: 1) A program of extensively diagnosed experiments to investigate the physics of intense relative electron beam propagation in low density air is in progress using beam generators. The primary objective of this research are the rate of erosion of the head of the beam, and to investigate resistive instabilities, such as the hose and hollowing modes, that limit transport of beam energy over significant distance. The tasks of delineating the pressure range for maximum energy transport and measuring the temporal evolution of the current density profile of the beam produced by the FX-100 have been accomplished. Maximum energy transport (measured calorimetrically) of the FX-100 beam (about 1.5 MeV, 40 kA, 120 ns) occurred at 0.3-0.8 Torr at pressure. This air pressure window for maximum energy transport was defined by loss of the tail of the beam at low pressures and by erosion of the beam head at low pressures. Propagation in the window was characterized by a high degree of current neutralization (about 8 or more), by intense light emission, suggestion of strong avalanche breakdown, and by the onset of a violent hollowing instability that resulted in as much as 80% of the beam current being carried in a

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thin annular shell at a radius about twice the Bennett radius characterizing the initially injected current distribution.

DESCRIPTORS: (U) *PARTICLE BEAM WEAPONS, *ELECTRON BEAMS, *BEAM FORMING, PARTICLE ACCELERATORS, EROSION, ELECTRODES, RANGE(DISTANCE), CURRENT DENSITY, ENERGY TRANSFER, LOSSES, VACUUM APPARATUS, WINDOWS, RADIATION ABSORPTION, RELATIVITY THEORY

IDENTIFIERS: (U) Plasma instabilities, Hose instabilities, Hollowing instabilities, Bennett radius, WUAFOSR2301A7, PEG1102P

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EEG SYSTEMS LAB SAN FRANCISCO CA

(U) Neurocognitive Pattern Analysis of Auditory and Visual Information. *PERCEPTION, *MOTOR REACTIONS, TEST METHODS, PILOTS, PERFORMANCE(HUMAN), ATTENTION, MEMORY(PSYCHOLOGY), JUDGEMENT(PSYCHOLOGY), LEARNING, HEARING, VISION, PATTERN RECOGNITION

DESCRIPTIVE DATE: Interim rept. 24 Mar 84-31 Jan 86.

IDENTIFIERS: (U) Evoked potentials, PE81102F, WJAFOSR2313A4

FEB 86 63P

PERSONAL AUTHORS: Gevins, Alan S. ;

CONTRACT NO F49620-84-K-0008

PROJECT NO 2313

TASK NO. 44

MONITOR: P. S. R. 86-0495

UNCLASSIFIED REPORT

ABSTRACT: The EEG Systems Laboratory has been actively improving the measurement of neuroelectric substrates of human higher brain functions. The short-term objective has been to use the EEG to predict decrements in performance consequent to attentional lapses or fatigue. The long-term objective is to develop new techniques for enhancing cognitive abilities. The laboratory continues to test subjects in highly controlled paradigms. The paradigms test elementary cognitive and perceptuomotor functions critical for flying high performance aircraft and for performing other tasks with a high cognitive load. Data are being analyzed in an interdisciplinary, inter-laboratory study of attentional fatigue. This unique set of data consists of 37 channels of neurophysiological, physiological and behavioral data recorded from 4 Air Force fighter test pilots performing several cognitive and perceptuomotor tasks specially designed to require a high component of attention, memory, judgement and motor coordination. Recordings were made in 3 sessions dealing with task learning, operational fatigue (about 18 hours of continuous performance), and automatization of task performance.

DESCRIPTORS: (U) *ELECTROENCEPHALOGRAPHY, *NEUROPHYSIOLOGY, *FATIGUE(PHYSIOLOGY), *COGNITION,

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ROXWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Nonlinear Wave Propagation Study.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Oct 85.

APR 86 82P

PERSONAL AUTHORS: Bulau, J. R.; Tittmann, B. R.;

REPORT NO. SC8301-10PR

CONTRACT NO. F49620-83-C-0085

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR

TR-86-0197

UNCLASSIFIED REPORT

ABSTRACT: (U) We have examined some of the methods available for use in the laboratory to measure the inelastic attenuation of seismic waves in rocks. We conclude that the forced swept resonance technique is best suited for measuring the Q of linear anelastic materials, and for defining the transition amplitude from linear elastic behavior to nonlinear behavior. For evaluation of losses in materials at high amplitudes, which exceed the elastic limit, the best technique requires simultaneous measurements of the time functions of stress and strain under conditions that simulate seismic loading as closely as possible.

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *GRANITE, *ROCK, *NONLINEAR PROPAGATION ANALYSIS, ELASTIC PROPERTIES, NEAR FIELD, ATTENUATION, PRESSURE, LOOPS, HYSTERESIS

IDENTIFIER: (U) Westerly granite, PE61102F.
WUAFOSR 3A2

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YALE UNIV NEW HAVEN CONN SCHOOL OF MEDICINE

(U) Studies of Organophosphate Effects on Retinal Physiology, Cell Biology and Biochemistry.

DESCRIPTIVE NOTE: Final progress rept. 1 Apr 82-31 Mar 84.

SEP 86 33P

PERSONAL AUTHORS: Reid, Ted W.; Stein, Peter J.;

CONTRACT NO. F49620-82-C-0050

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-86-0496

UNCLASSIFIED REPORT

ABSTRACT: (U) We have approached the problem of DFP effects on the eye in several ways: 1) Dose response curves for DFP inhibition of cellular synthesis of DNA was studied in three different cell types. 2) Electoretinograms (ERG's) were recorded from isolated retinas of Bufo marinus during superfusion with the compound. 3) Intracellular recordings were made from rod photoreceptors in isolated retinas while superfusing with NaF. 4) The effects of fluoride on the protein-protein interactions and the enzymology of the cyclic nucleotide cascade of rod outer segments were studied. 5) DFP binding to rod outer segment and retinal proteins was observed. 6) We have measured the transport of DFP across the cornea. The data obtained show that both DFP and fluoride alter various enzymatic and physiological functions in cultured cells, the isolated retina, and rod outer segment membranes. The data obtained in the project reveal that both DFP and fluoride may alter ocular biochemistry and physiology through other than classical acetylcholinesterase mechanisms. While a number of the studies performed are preliminary, the data are sufficiently interesting to demand further investigation.

DESCRIPTORS: (U) *ORGANIC PHOSPHORUS COMPOUNDS, *PROPYL RADICALS, *FLUORINE, *TOXICITY, *RETINA, VISION, DOSAGE, CELLS(BIOLOGY), BIOSYNTHESIS, DEOXYRIBONUCLEIC ACIDS,

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SEARCH CONTROL NO. EVN34M

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INHIBITION, ELECTRORETINOGRAPHY, FLUORIDES, IONS,
PROTEIN, MOLECULE MOLECULE INTERACTIONS, CORNEA,
TRANSFERRIN PROPERTIES, PHOSPHATASES, ESTERASES
IDENTIFIERS (U) DFP(Diisopropylfluorophosphate),
Phosphate Diisopropylfluoro, PEB1102F, WUAFDSR2312A5

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MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATERIALS
SCIENCE AND ENGINEERING

(U) A Study of the Fatigue Behavior of Short Cracks in
Nickel-Based Superalloys.

DESCRIPTIVE NOTE: Progress rept. 1 Jan 84-30 Nov 85.

NOV 85 38P

PERSONAL AUTHORS: Pelloux, R. M.; Romanoski, G. R.; Feng, J.

CONTRACT NO. AFOSR-78-2828, AFOSR-84-0078

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-88-0224

UNCLASSIFIED REPORT

ABSTRACT: (U) Fatigue behavior of short cracks was studied in Inconel X-780, Inconel 718, Waspaloy and PM-Rene 85. Crack growth rates were measured for crack lengths from 50 microns to 2mm. Three regimes of behavior were generally observed: 1) an initiation regime in which crack propagation rates are nearly zero; 2) a short crack regime in which crack propagation rates increase slowly and variably with crack length but with propagation rates higher than would be predicted by LEFM in the near-threshold regime; and 3) a long crack regime in which conventional fracture mechanics is applicable. The threshold criterion and crack propagation rates for short cracks are shown to be strongly dependent on the stress ratio. Negative stress ratios promotes rapid crack initiation. This behavior is confirmed theoretically by a Dugdale model which establishes a criterion for crack extension based on the accumulation of plastic work in the crack tip plastic zone. Fractographic investigations show that short cracks propagate in a transgranular-crystallographic mode following a zig-zag path which is macroscopically perpendicular to the applied stress. An experimental technique was developed to generate small elliptical crack initiation sites using a pulsed Nd-YAG laser. An AC potential drop system for continuous and

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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autoasted measurements of crack length at elevated temperature has been assembled.

DESCRIPTORS (U) *CRACK PROPAGATION, *SUPERALLOYS, *NICKEL ALLOYS, *FATIGUE (MECHANICS), TURBINE COMPONENTS, CRACKS, RATES, MATHEMATICAL PREDICTION, FRACTURE MECHANICS, HIGH TEMPERATURE, STRESSES, RATIOS, NICKEL ALLOYS, INCOEL, FRACTOGRAPHY, PULSED LASERS

IDENTIFIERS (U) Short cracks, Crack tips, Waspalloy, Range-95, Crack propagation rates, Dugdale models, Threshold, Crack initiation, Neodymium YAG lasers, PE01102F, AFOSR2306A1

PITTSBURGH UNIV PA DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Advanced High Temperature Coating Systems Beyond Current State of the Art Systems.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 80-31 Dec 84.

APR 88 143P

PERSONAL AUTHORS: Ashary, A.; Meler, G. H.; Pettit, F. S.;

CONTRACT NO. AFOSR-80-0089

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR TR-88-0481

UNCLASSIFIED REPORT

ABSTRACT: (U) Alpha-Al2O3 and the SiO2 are the two most effective reaction product barriers that can be used to protect alloys from oxidation at temperatures above 1000 C. In the present work the techniques to improve the adherence of Al2O3 scales on MCrAl coating alloys are studied and the characteristics of SiO2 scales formed on Ni-Si alloys are investigated. The theoretical aspects of oxide-metal adhesion are examined and the factors which affect the adherence of oxide scales in general are clearly defined. A critical review of the previously proposed mechanisms of the improved scale adherence by active element additions is presented. Experimentally, the effects of small additions of yttrium and hafnium on the isothermal and cyclic oxidation behavior of MCrAl type alloys are studied. The base alloys used in the study of Al2O3 scale adherence were Ni-20wt%Cr-10wt%Al and Co-20wt%Cr-10wt%Al. Both the isothermal and the cyclic oxidation tests were carried out at 1100 C for varying durations. Emphasis is given to the in situ study of the oxide scale failure process. An acoustic emission (AE) technique was employed for this purpose. The above study indicates that the Al2O3 scale failure processes are quite different in the doped (i.e. containing oxygen active elements) and undoped alloys. Although both

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 187 CONTINUED

Yttrium and hafnium can be very effective in improving the adhesion of Al2O3 scales, there are some basic differences in their oxidation behavior in alloys. Therefore, the optimum conditions for their addition also differ. Alloys in the Ni-Si system (5 to 22.5wt% Si) have been oxidized in the temperature range 800 to 1100 C.

DESCRIPTORS: (U) *PROTECTIVE COATINGS, *ALUMINUM OXIDES, *SILICON DIOXIDE, HIGH TEMPERATURE, OXIDATION RESISTANCE, CHROMIUM ALLOYS, ALUMINUM ALLOYS, NICKEL ALLOYS, SILICON ALLOYS, *EROSION, ADDITIVES, YTTRIUM, HAFNIUM, COBALT, FAILURE, CRACKING

IDENTIFIERS: (U) WUAFOSR2308A2

AD-A170 187 12/1

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

(U) Upper Semicontinuity of Attractors for Approximations of Semigroups and Partial Differential Equations.

DESCRIPTIVE NOTE: Technical rept..

OCT 85 74P

PERSONAL AUTHORS: Hale, Jack K. ; Lin, Xiao-Biao ; Raugel, Genevieve ;

REPORT NO. LCDS-85-29

CONTRACT NO. DAAG29-83-K-0029, AFOSR-84-0378

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-88-0374

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Michigan State Univ., East Lansing. Dept. of Mathematics and Ecole Polytechnique (France). Centre de Mathematiques Appliquees. Sponsored in part by Grant NSF-DMS85-07058.

ABSTRACT: (U) Suppose a given evolutionary equation has a compact attractor and the evolutionary equation is approximated by a finite dimensional system. Conditions are given to ensure the approximate system has a compact attractor which converges to the original one as the approximation is refined. Applications are given to parabolic and hyperbolic partial differential equations.

DESCRIPTORS: (U) *APPROXIMATION(MATHEMATICS), *PARTIAL DIFFERENTIAL EQUATIONS, CONVERGENCE, BANACH SPACE, WAVE EQUATIONS

IDENTIFIERS: (U) *Attractors, *Semigroups(Mathematics), Semicontinuity, PEB1102F, WUAFOSR2304A1

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12/1

MARYLAND
RESEARCH

COLLEGE PARK CENTER FOR AUTOMATION

(U) Random field Identification from a Sample 1. The
Index at Case.

DESCRIPTIVE NOTE: Technical rept.,

NOV 85 25P

PERSONAL AUTHOR: Rosenblatt-Roth, Millicent

REPORT NO. CAR-TR-186, CS-TR-1863

CONTRACT NO. F49320-85-K-0009

PROJECT NO. 2304

TASK NO. 57

MONITOR: AFOSR
TR-88-0388

UNCLASSIFIED REPORT

ABSTRACT: (U) Given a random field belonging to some specific class, and given a data sample generated by the random field, the author considers the problem of finding a field that approximates the field. This paper derives a solution to this problem for the simple case of a field consisting of independent random variables. Subsequent papers will treat other types of fields, e.g., having Markov dependencies. Numerical examples are given, showing that good approximations can be obtained based on relatively small sample sizes. In particular, this approach can be used to generate random field models that generate given samples of image texture, and so can be applied to texture classification or segmentation. (Author)

DESCRIPTORS: (U) *STATISTICAL SAMPLES, APPROXIMATION(MATHEMATICS), THEOREMS, INVERSION, RANDOM VARIABLES, SEQUENCES(MATHEMATICS), PROBLEM SOLVING, MARKOV PROCESSES, STATIONARY

IDENTIFIERS: (U) PEB1102F, MUAFOSR2304A7

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AD-A170 184 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Normalizing Transformations of Some Statistics of Gaussian ARMA Processes.

DESCRIPTIVE NOTE: Technical rept.,

FEB 86 24P

PERSONAL AUTHORS: Taniguchi, M.; Krishnamah, P. R.; Chao, R.

REPORT NO. TR-86-05

CONTRACT NO. F49620-85-C-0000

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0395

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the authors investigate Edgeworth type expansions of certain transformations of some statistics of Gaussian ARMA processes. They also investigated transformations which will make the second order part of the Edgeworth expansions vanish. Some numerical studies are made and they show that the above transformations give better approximations than the usual approximation. (Author)

DESCRIPTORS: (U) *TRANSFORMATIONS(MATHEMATICS), *NORMALIZING(STATISTICS), NUMERICAL ANALYSIS, APPROXIMATION(MATHEMATICS), EXPANSION, TIME SERIES ANALYSIS, MAXIMUM LIKELIHOOD ESTIMATION, MULTIVARIATE ANALYSIS

IDENTIFIERS: (U) Edgeworth expansion, ARMA(Autoregressive Moving Average)

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 183 12/1 8/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Data Transformations in Regression Analysis with Applications to Stock - Recruitment Relationships.

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 88.

88 21P

PERSONAL AUTHORS: Ruppert, David ; Carroll, R. J. ;

CONTRACT NO. F49620-82-C-0008, NSF-MCS87-3129

PROJECT NO. 2304

TASK NO. 25

MONITOR: AFOSR TR-88-0408

UNCLASSIFIED REPORT

ABSTRACT: (U) The authors propose a methodology for fitting theoretical models to data. The dependent variable (response) and the model are transformed in the same way. Two types of transformations, power transformation and weighting, are used together to remove skewness and to induce constant variance. This method is applied to the stock-recruitment data of four fish stocks. Also discussed are estimates of the conditional mean and the conditional quantiles of the original response. (Author)

DESCRIPTORS: (U) *MATHEMATICAL MODELS, *TRANSFORMATIONS(MATHEMATICS), *FISHERIES, FISHES, REGRESSION ANALYSIS, FITTING FUNCTIONS(MATHEMATICS), VARIATION, ESTIMATES, WEIGHTING FUNCTIONS, SKEWNESS, VARIABLES

IDENTIFIERS: (U) *Biomathematics, PEB1102F, WUAFOSR2 145

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NORTHEASTERN UNIV BOSTON MASS DEPT OF ELECTRICAL ENGINEERING

(U) Asynchronous Finite State Machines. Simulations with Imposed Processing Constraints.

DESCRIPTIVE NOTE: Technical rept.,

APR 86 3P

PERSONAL AUTHORS: Kwokam, S. Y. ; Koltski, M. E. ; Miller, A. T. ; Johnson, T. L. ;

CONTRACT NO. F49620-82-C-0080

MONITOR: AFOSR TR-88-0448

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with General Electric Co., Schenectady, NY and Universite de Youunde, Cameroun.

ABSTRACT: (U) The action of computer control systems on continuous time discrete state processes can be accurately represented by asynchronous finite state machines, and, in particular, a subclass of these machines termed simple asynchronous machines, or SAMs. To understand the role that practical signal processing constraints may play in characterizing SAM behavior, a simulator capable of incorporating such constraints has been written. The architecture of this simulator and examples of its use are presented.

DESCRIPTORS: (U) *AUTOMATA, *COMPUTER APPLICATIONS, *CONTROL SYSTEMS, CONTROL SIMULATORS, DIGITAL SYSTEMS

IDENTIFIERS: (U) SAM(Simple Asynchronous Machines), PEB1102F, WUAFOSR2304A1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 177 12/1 20/11

STANFORD UNIV CA DEPT OF MATHEMATICS

(U) Free Boundary Problems in Mechanics.

OCT 84 4P

PERSONAL AUTH: Keller, Joseph B. ;

CONTRACT NO. SR-85-0007

PROJECT NO. 4

TASK NO. A4

MONITOR: AF TR 0471

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Review, v26 n4 p589-571 Oct 84.

ABSTRACT: (U) It is shown how to taper a heavy rope, hanging vertically, to minimize the elongation due to its own weight; a load at its lower end. Hooke's law is used to determine the elongation, and the calculus of variations is used to find that taper which minimizes it.

DESCRIPTORS: CALCULUS OF VARIATIONS, *ROPE, SUSPENDING, *WGT, ELASTIC PROPERTIES, APPLIED MECHANICS, *TIPS

IDENTIFIERS: Hooke's law, Lagrange multipliers, Classical mechanics, WUAF05R2304A4, PE61102F

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AD-A170 174 12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION AND DECISION SYSTEMS

(U) Analysis of Simulated Annealing for Optimization.

DESCRIPTIVE NOTE: Technical rept..

SEP 85 34P

PERSONAL AUTHORS: Gelfand, Saul B. ; Mitter, Sanjoy K. ;

REPORT NO. LIDS-P-1494

CONTRACT NO. DAAG29-82-0135, AFOSR-82-0258

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-88-0349

UNCLASSIFIED REPORT

ABSTRACT: (U) Simulated annealing is a popular Monte Carlo algorithm for combinatorial optimization. The annealing algorithm simulates a nonstationary finite state Markov chain whose state space is the domain of the cost function to be minimized. We analyze this chain focusing on those issues most important for optimization. In all of our results we consider an arbitrary partition optimization; important special cases are when I is the set of minimum cost states or a set of all states with sufficiently small cost. We give a lower bound on the probability that the chain visits I at some time. This bound may be useful even when the algorithm does not converge. We give conditions under which the chain converges to I in probability and obtain an estimate of the rate of convergence as well. We also give conditions under which the chain visits I infinitely often visits I almost always, or does not converge to I with probability 1. (Author)

DESCRIPTORS: (U) *MONTE CARLO METHOD, *ALGORITHMS, *COMBINATORIAL ANALYSIS, OPTIMIZATION, CONVERGENCE, ESTIMATES

IDENTIFIERS: (U) Simulated annealing, Markov chains.

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WUAFOS 441, PEB1102F

AD-A170 173 9/3 12/1

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Efficient Parameter Identification for a Class of Bilinear Differential Systems.

85 8P

PERSONAL AUTHORS: Pearson, E. A.; Lee, F. C. ;

CONTRACT NO. AFOSR-85-0300

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-85-0430

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IFAC Identification and System Parameter, p161-165 1985.

ABSTRACT: (U) Using sinusoidal probing signals on sequential time intervals of finite duration, a least squares parameter identification technique is developed for a class of bilinear differential systems which avoids the usual point-wise-in-time cross multiplication between the input-output data and avoids dealing with all unknown initial (boundary) conditions over each finite time interval. The basis of the technique is Shinbrot's method of moment functionals using commensurable sinusoids as the modulating functions. The main result is the demonstration that the sequential least squares procedure for the bilinear system parameters with sinusoidal inputs can be set up using a single Fast Fourier Transform of the output data over each finite time interval which is essentially the same computational requirement as attends the formulation for a linear system model. (Author)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *PARAMETRIC ANALYSIS, *LEAST SQUARES METHOD, IDENTIFICATION, TIME INTERVALS, FAST FOURIER TRANSFORMS, METHOD OF MOMENTS, REPRINTS

IDENTIFIERS: (U) *Bilinear differential systems, WUAFOSR2304A1, PEB1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 171 20/4

RENSELAER POLYTECHNIC INST TROY N Y DEPT OF MATHEMATICS

(U) Lax-Friedrichs and the Viscosity-Capillarity Criterion.

85 12P

PERSONAL AUTHOR: S. Slemrod, Marshall;

CONTRACT NO. AFOSR-81 0172

PROJECT NO. 2304

TASK NO. A1

MONITOR: A. R.
TR-88-0378

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Mathematics and Nonlinear Partial Differential Equations, p75-84 1985.

ABSTRACT: (U) It has been shown by Lax some time ago that solutions of hyperbolic conservation laws obtained as limits of the Lax-Friedrichs finite difference scheme will satisfy an 'entropy' admissibility criterion. The goal of this paper is to attempt to extend Lax's idea to a form which is amenable to mixed problems as well. The author compares shocks obtained by the Specificity scheme with those permitted by the Lax-Friedrichs scheme with those permitted by the viscosity criterion. He shows that for isotherms, it is expected that shocks produced by Lax-Friedrichs will satisfy the viscosity-capillarity criterion. (Author)

DESCRIPTORS: (U) *COMPRESSIBLE FLOW, *ISOTHERMS, SHOCK WAVES, VISCOSITY, CAPILLARITY, REPRINTS

IDENTIFIERS: (U) *Van der Waals fluids, Lax Friedrichs finite difference method, WUAFDSR2304A1, PE61102F

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PITTSBURGH UNIV PA DEPT OF MATHEMATICS AND STATISTICS

(U) A Multivariate Extension of Hoeffding's Lemma.

DESCRIPTIVE NOTE: Technical rept.,

NOV 85 24P

PERSONAL AUTHOR: Block, Henry W.; Fang, Zhaoben;

REPORT NO. TR-85-10

CONTRACT NO. N00014-84-K-0084, AFOSR-84-0113

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0410

UNCLASSIFIED REPORT

ABSTRACT: (U) Hoeffding's Lemma gives an integral representation of the covariance of two random variables in terms of difference between their joint and marginal probability functions. This identity has been found to be useful tool in studying the dependence structure of various random vectors. A generalization of this result for more than 2 random variables is given. This involves an integral representation of the multivariate joint cumulant. Applications of this result include characterizations of independence. Relationships with various types of dependence are also given. (Author)

DESCRIPTORS: (U) *MULTIVARIATE ANALYSIS, THEOREMS, RANDOM VARIABLES, COVARIANCE, DISTRIBUTION FUNCTIONS

IDENTIFIERS: (U) Hoeffdings Lemma, WUAFDSR2304A5, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34W

AD-A170 189 12/1

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BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Parameter Identification of Linear Differential Systems via Fourier Based Modulating Functions.

MAXIMUM LIKELIHOOD ESTIMATION, LEAST SQUARES METHOD, SIGNAL TO NOISE RATIO, METHOD OF MOMENTS

DEC 85 30p

IDENTIFIERS: (U) Fast algorithm, Shintbrots method, WUAFDSR2304AS, PE81102F

PERSONAL AUTH: 45 Pearson, A. E.; Lee, F. C.

CONTRACT NO AFOSR-85-0300

PROJECT NO. 2304

TASK NO. A3

MONITOR: A R
T 88-0428

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Control Theory and Advanced Technology 1/14 p239-266 Dec 85.

ABSTRACT: The parameter identification of linear differential systems is considered from the viewpoint of Shintbrots' classical method of moment functionals using sinusoids as the modulating functions. This facilitates least squares estimation in which the underlying computations require calculating a finite set of Fourier coefficients of time limited input-output data while avoiding the necessity to estimate unknown initial conditions for a one-shot estimate or least squares. It is noted that a fast Fourier transform algorithm can be utilized for these calculations, thus providing a fast algorithm for the identification of continuous time systems. It is shown that the frequency domain correlation can be useful in enhancing the signal to noise ratio of the modulated data in the presence of noisy measurements. A maximum likelihood estimate developed for the stochastic case of additive white Gaussian noise in the data which effectively removes bias when the parameter identification is considered in a recursive mode. Simulation results are included to illustrate the developments. (Author)

DESCRIPTORS: (U) *LINEAR DIFFERENTIAL EQUATIONS. *PARAMETER ANALYSIS. REPRINTS. FAST FOURIER TRANSFORMS.

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AD-A170 166 12/1

STANFORD UNIV CA DEPT OF MATHEMATICS

STANFORD UNIV CA DEPT OF MATHEMATICS

(U) On the Solvability of Inverse Scattering Problems.

(U) A Rigorous Derivation of the Miracle Identity of Three-Dimensional Inverse Scattering.

84 12P

PERSONAL AUTHOR: S. Fawcett, John ;

OCT 84 4P

CONTRACT NO AFOSR-85-0007

PERSONAL AUTHORS: Cheney, Margaret ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-85-0007

TASK NO. A4

PROJECT NO. 2304

MONITOR: A R
T 83-0453

MONITOR: AFOSR

TR-88-0458

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Wave Motion, v6 p489-499 1984

SUPPLEMENTARY NOTE: Pub. in Journal of Mathematical Physics, v25 n10 p2988-2990 Oct 84.

ABSTRACT: (U) Some aspects of the time-dependent inverse scattering problems are discussed. Then some simple stability results are presented. Several analytical and numerical results are given to illustrate them. (Author)

ABSTRACT: (U) The large energy asymptotic behavior of scattering solutions of the three dimensional time dependent Schrodinger equation is investigated. The second term of the expansion leads to the 'miracle' of Newton's three dimensional inverse scattering theory.

DESCRIPTORS: (U) *INVERSE SCATTERING, STABILITY, TIME DEPENDENCE, NUMERICAL ANALYSIS, BOUNDARY VALUE PROBLEMS, REPRINTS

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A4

DESCRIPTORS: (U) *SCHRODINGER EQUATION, *SOLUTIONS(GENERAL), ASYMPTOTIC SERIES, FOURIER TRANSFORMATION, INVERSE SCATTERING, THREE DIMENSIONAL, REPRINTS

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A5

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AD-A170 115 9/4

TEXAS A&M UNIV COLLEGE STATION DEPT OF ELECTRICAL
ENGINEERING

(U) Asymptotically Robust Detection of Stochastic Signals
in Laminated Noise.

MAY 86 8P

PERSONAL AUTHORS: Schnitzer, M. S.; Halverson, D. R.;

CONTRACT NO. AFOSR-82-0033

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0433

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at Annual Allerton
Conference on Communication, Control, and Computing (23rd)
2-4, 1985.

ABSTRACT: (U) We consider the discrete time detection of
stochastic signals in white noise, where the univariate
noise density is known perfectly only on an interval
about the origin. We present a method to enhance the
asymptotic performance of the detector by exploiting this
knowledge, and at the same time preserve robustness
proper to the detector to the remaining inexact
knowledge of the univariate noise density via a
saddle point condition. We then provide examples to show
that improved performance is indeed obtained. (Author)

DESCRIPTORS: (U) *NOISE, *SIGNALS, *DETECTION,
OPTIMUM, WHITE NOISE

IDENTIFIERS: (U) Stochastic signals, Detection (Robust),
Noise (Laminated), PE81102F

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FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Bayesian Nonparametric Estimation of the Median. Part
2. Asymptotic Properties of the Estimates.

85 22P

PERSONAL AUTHORS: Doss, Hans;

REPORT NO. FSU-STATISTICS-M857, P-459

CONTRACT NO. F49620-85-C-0007, NSF-MCS80-24049

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0407

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Annals of Statistics, v13
n4 p1445-1484 1985. See also Part 1, AD-A170 122.

ABSTRACT: (U) For data theta + epsilon sub i = i, ..., n
where epsilon sub i are i.i.d. similar to F with the
median of F equal to 0 but F otherwise unknown, it is
desired to estimate theta. In Doss (1985) priors are put
on the pair (F, theta), the marginal posterior
distribution of theta is computed, and the mean of the
posterior is taken as the estimate of theta. In this
paper a frequentist point of view is adopted. The
consistency properties of the Bayes estimates computed in
Doss (1985) are investigated when the prior on F is of
the Dirichlet-type. Any F whose median is 0 is in the
support of these priors. It is shown that if the epsilon
sub i are i.i.d. from a discrete distribution, then the
Bayes estimates are consistent. However, if the
distribution of the epsilon sub i's is continuous, the
Bayes estimates can be inconsistent. (Author)

DESCRIPTORS: (U) *NONPARAMETRIC STATISTICS, *ESTIMATES,
BAYES THEOREM, CONSISTENCY, ASYMPTOTIC NORMALITY,
DISCRETE DISTRIBUTION, REPRINTS

IDENTIFIERS: (U) Median, Continuous distribution,
PE81102F

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI-34M

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AD-A170 182 17/2 14/4

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

CLENSON UNIV SC

(U) Rank Deficient Least Squares and the Numerical Solution of Linear Singular Implicit Systems of Differential Equations.

(U) Exact and Approximate Dependent Failure Reliability Models for Telecommunications Networks.

BR 14P

MAR 85 BP

PERSONAL AUTHORS: Campbell, Stephen L. ;

PERSONAL AUTHORS: Shier, D. R. ; Spragins, J. D. ;

CONTRACT NO. AFOSR-84-0240, (NSF)-(DMS)83-18028

CONTRACT NO. AFOSR-84-0184

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. 45

TASK NO. A5

MONITOR: ER 88-0420

MONITOR: AFOSR TR-88-0341

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Contemporary Mathematics, v47 p81-83 1985

SUPPLEMENTARY NOTE: Pub. in IEEE Proceedings INFOCOM '85, p200-208, 28-28 Mar 85.

ABSTRACT: (U) An approach for the numerical solution of linear systems of differential equations of the form $A(t)x'(t) + B(t)x(t) = f(t)$ with $A(t)$ singular is discussed. The key to this approach is the solution of a rank deficient least squares problem. The solution of this least squares problem is investigated. These results are then applied to the system of differential equations. (Author)

ABSTRACT: (U) Previous papers by one of the authors have presented both an exact, but computationally slow, method for computing the reliability of telecommunication networks with dependent failures and a much faster approximation to this method. Both methods are based on using parameters that capture the statistical dependencies and that are intuitive and reasonably easy to measure. This paper extends such previous work by giving a considerably more efficient approach to the calculations for the exact case plus a new series of approximations which converge to the exact solution. (Author)

DESCRIPTOR: (U) *LEAST SQUARES METHOD, LINEAR SYSTEMS, PARTIAL DIFFERENTIAL EQUATIONS, SOLUTIONS(GENERAL), REPRINTS

DESCRIPTORS: (U) *TELECOMMUNICATIONS, *COMMUNICATIONS NETWORKS, *RELIABILITY, APPROXIMATION(MATHEMATICS), MODELS, REPRINTS

IDENTIFIER: (U) PE81102F

IDENTIFIERS: (U) Exact Solutions, PE81102F

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BROWN, RIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL
SYSTEMS

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MECHANICAL
ENGINEERING

(U) Limiting Behavior of Linearly Damped Hyperbolic
Equations.

(U) Large Eddy Structures in Transitional and Turbulent
Flames.

JAN 80 43P

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-3C Jun 85.

PERSONAL AUTHORS: Hale, Jack K.; Stavrakakis, Nicholas;

AUG 85 74P

REPORT NO. LCDS-88-6

PERSONAL AUTHORS: Chigler, Norman;

CONTRACT NO. DAAG-29-83-K-0029, AFOSR-84-0378

CONTRACT NO. AFOSR-82-0288

PROJECT NO. 2304

PROJECT NO. 2308

TASK NO. A1

TASK NO. A2

MONITOR: AFOSR
TR-88-0373

MONITOR: AFOSR
TR-88-0499

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-DMS85-
07068

ABSTRACT (U) For a linearly damped wave equation in a
bounded domain in R^n , it is shown that there is a
compact attractor in H^1 power $x \rightarrow L$ to the 2nd power as
well as in $(H^1 \text{ to the 2nd power} \cap H^2)$ to the 1st power. Similar
results are given for the linearly damped beam equation.
(Author)

DESCRIPTORS (U) *LINEAR DIFFERENTIAL EQUATIONS, *WAVE
EQUATIONS, DAMPING, BANACH SPACE, OPERATORS (MATHEMATICS),
THEOREM

IDENTIFIERS (U) *Hyperbolic differential equations,
Beam equations, Compact attractors,
Semigroups (Mathematics), P681102F

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ABSTRACT: (U) An experimental investigation of
transitional and turbulent jet diffusion flames was
carried out with emphasis on the derivation of time-
dependent information from measurement of various
fluctuating quantities in these flames. Special efforts
were made to control carefully, and vary systematically,
the initial and boundary conditions of each flame.
Mapping of the signal reveals that the inner flame
boundary moves radially outward in the near flow-field ($x/D=10$ to $x/D=40$) and later converges toward the flame axis.
Meanwhile, the outer flame boundary grows steadily with
downstream (axial) distance, indicating a consistently
widening reaction zone, for the entire area examined ($x/D=10$ to $x/D=80$). Profiles of RMS values of ion current
were correlated with flame boundary locations. A double
peak pattern was found in the RMS profiles, each peak
coinciding with the large gradients of the mean ion
current profiles. Near the inner flame boundary, the
flame front fluctuates across the probe's sampling volume,
generating largely fluctuating components of ion current.
In the central flame region, the probe experiences a more
continuous flame presence and less fluctuations. This
causes the mean ion current signal to remain high while
the RMS signal drops off rather rapidly. As the outer
flame boundary is approached, an increase in fluctuations

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 15 CONTINUED

again to place.

DESCRIPTIVE NOTE: (U) *JET FLAMES, EDCIES(FLUID MECHANICS),
TURBULENCE, DIFFUSION, MAPPING, BOUNDARIES, TRANSITIONS,
JET MIXING FLOW, AIR FLOW, ATTACHMENT,
IONIZATION, IONIC CURRENT, POWER SPECTRA, FAST
FORMS, LASER ANEMOMETERS, DOPPLER SYSTEMS,
TIME DEPENDENCE, METHANE, PROPANE

IDENTIFIER: (U) Jet diffusion flames. Transitional. Jet
flames, 1102F, WUAFOSR2308A2

AD-A170 145 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) Regenerative Sampling and Monotonic Branching
Processes.

DESCRIPTIVE NOTE: Technical rept.,

MAY 38 30P

PERSONAL AUTHORS: Durham, Stephen D.; Yu, Kai F.;

REPORT NO. TR-118

CONTRACT NO. AFOSR-84-0158

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0429

UNCLASSIFIED REPORT

ABSTRACT: (U) A regenerative sampling plan is proposed
for the sequential comparison of two populations having
positive integral response. It is designed to be both an
extension and an improvement of the play-the-winner rules
for binary trials in the sense that a much wider variety
of responses is allowed, the fraction of inferior
selections approaches zero, and the play-the-winner rule
is contained as a special case. Almost sure convergence
and moment convergence in the pth order is studied for
the fraction of inferior selections and for a maximum
likelihood estimator of the mean response. A conditional
test of hypothesis is given for the binary case. (Author)

DESCRIPTORS: (U) *STATISTICAL SAMPLES,
POPULATION(MATHEMATICS), SELECTION, RANDOM VARIABLES,
ESTIMATES, INTEGRALS, COMPARISON

IDENTIFIERS: (U) Play the winner rule, PE81102F,
WUAFOSR2304A5

AD-A170 15

AD-A170 145

UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 144 12/1

AD-A170 138 11/8

MARYLAND UNIV BALTIMORE COUNTY BALTIMORE DEPT OF MATHEMATICS

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE

(U) The h-p Version of the Finite Element Method with Quasi Uniform Meshes.

(U) The Use of Novel Processing Procedures for Improving Overall Fatigue Resistance of High Strength Aluminum Alloys.

DESCRIPTIVE NOTE: Summary rept.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 88.

MAY 88 84P

APR 88 105P

PERSONAL AUTHORS: Babuska, Ivo ; Suri, Manil ;

PERSONAL AUTHORS: Starke, Edgar A. , Jr.;

REPORT NO. MRR-88-1

REPORT NO. UVA/525844/MS86/101

CONTRACT NO. AFOSR-88-0322, NSF-DMS83-15216

CONTRACT NO. AFOSR-83-0061

PROJECT NO. 2304

PROJECT NO. 2308

TASK NO. A3

TASK NO. A1

MONITOR: AFOSR
TR 88-0382

MONITOR: AFOSR
TR-88-0482

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT (U) The classical error estimates for the h-p version of the finite element method are extended for the h-p version. The estimates are expressed as explicit functions of h and p and are shown to be optimal. The estimates are given for the case where the solution u (H^{s,k}) is the case when u has singularities at the corners of the domain. (Author)

ABSTRACT: (U) Its objective is to develop an understanding of the mechanisms involved in the initiation and propagation of cracks in metals in order to optimize the microstructure of high strength aluminum alloys for overall fracture resistance. The research conducted during this year was divided into three tasks. Task I was concerned with the effects of slip character and grain size on the intrinsic material and extrinsic closure contributions to fatigue crack growth resistance of 7475. It involved the use of thermomechanical processing to modify the grain structure for enhancement of both intrinsic and extrinsic effects. In our last report we described the use of a direct current potential drop technique (DC-PD) to examine the possibility of crack tip welding in vacuum and the results of our initial experiments using this method. Task II was concerned with a study of the fatigue crack growth and fracture mechanisms of an Al-Li-Cu alloy. Task III was concerned with secondary cracking in Al-Li-Cu, Al-Li-Mg and Al-Li-Cu-Mg alloys. Many recent studies of this class of alloys have shown that they can exhibit severe grain boundary cracking. The most commonly-observed manifestation of this cracking is the appearance of

DESCRIPTORS: (U) *FINITE ELEMENT ANALYSIS, *ESTIMATES, ERROR ANALYSIS, MESH, OPTIMIZATION, CONVERGENCE, POLYGONS, POLYACETALS

IDENTIFIER: (U) PE81:02F, WUAFOSR2304A3

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OTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

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secondary cracks on fracture surfaces of tensile specimens loaded parallel to the rolling direction.

DESCRIPTORS: (U) *CRACK PROPAGATION, *HIGH STRENGTH ALLOYS, *TITANIUM ALLOYS, FRACTURE(MECHANICS), RESISTANCE, FATIGUE(MECHANICS), THERMOECHANICS, *GRAIN STRUCTURE, *METALLURGY, *RAIN SIZE, GROWTH(GENERAL), LITHIUM ALLOYS, COPPER ALLOYS, TOUGHNESS, MAGNESIUM ALLOYS

IDENTIFIERS: (U) PE81102F, WUAF0SR2308A1

AD-A170 128 20/5 14/2

CITY COLL NEW YORK ULTRAFAST SPECTROSCOPY AND LASER LAB

(U) Picosecond and femtosecond Spectroscopic Instrumentation for Ultrafast Spectroscopy and Lasers.

DESCRIPTIVE NOTE: Final rept. 14 Dec 84-31 Dec 85.

MAR 86 8P

PERSONAL AUTHORS: Alfano, Robert R. ;

CONTRACT NO. AFOSR-85-0055

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR
TR-86-0498

UNCLASSIFIED REPORT

ABSTRACT: (U) The Institute has acquired state-of-the-art ultrafast lasers and diagnostic instrumentation to upgrade its facilities and capabilities. A femtosecond mode locked CPM dye laser - dye amplifier system was substantially improved by the addition of new YAG laser pump. This femtosecond system will be used in the study of ultrafast processes in semiconductor microstructures and alloys. A multichannel Raman spectroscopic system was installed for use in the study of transient Raman effect in semiconductors and shock wave induced processes. An ultrafast streak camera was acquired for photoluminescence kinetic studies in semiconductor alloys and microstructures with a time resolution of 2 ps.

DESCRIPTORS: (U) *MODE LOCKED LASERS, *LASER PUMPING, *DYE LASERS, YAG LASERS, LABORATORY EQUIPMENT, LASER AMPLIFIERS, OPTICAL DETECTORS, MULTICHANNEL, PULSED LASERS, STREAK CAMERAS, TIME STUDIES, RAMAN SPECTRA

IDENTIFIERS: (U) Femtosecond time, Ultrafast spectroscopy, Picosecond time, PE81102F, WUAF0SR2917A3

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AD-A170 128

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OTIC REPORT BIBLIOGRAPHY

AD-A170 125 6/16 14/2 9/3 12/1
PURDUE UNIV LAFAYETTE IN EEG SIGNAL PROCESSING LAB

(U) Detection, Estimation, and Multidimensional Processing of Stimulus Evoked Potentials.

DESCRIPTION: Final rept. 1 May 83-30 Apr 85.

SEP 85 147P

PERSONAL AUTHORS: Amon, J. I.; McGillem, C. D.;

CONTRACT NO. F49620-83-K-0031

PROJECT NO. 2313

TASK NO. 34

MONITOR: AFOSR
TR-86-0387

UNCLASSIFIED REPORT

ABSTRACT: (U) A new method of generating and selecting features for computer classification of ERP waveforms is described. The technique employs features that are time samples of measured ERP waveforms that have been bandpass filtered. An improvement of more conventional techniques is shown with both simulated and measured data. A comparison of performance of a quadratic classifier with optimum feature selection is made with one using (suboptimal) forward segmented feature selection. Details of the design and performance are presented for an optimum time-varying filter for estimating ERP waveforms. The filter accepts inputs from multiple electrodes and generates an estimate for the waveform at a single electrode. Results for both simulated and measured data are presented. Some preliminary studies of artifact generation in ERP waveforms are described.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *ESTIMATES, *PATTERN RECOGNITION, BANDPASS FILTERS, ELECTROENCEPHALOGRAPHY, DETECTION

IDENTIFIERS: (U) Feature selection, Multidimensional processing, ERP(Event Related Potentials), Evoked Potentials, PE81102F, WUAFOSR2313P4

AD-A170 125

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SEARCH CONTROL NO. EVN34M

AD-A170 122 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Bayesian Nonparametric Estimation of the Median. Part 1. Computation of the Estimates.

85 14P

PERSONAL AUTHORS: Doss, Hans;

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0406

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Annals of Statistics, v13
no p1432-1444 1985.

ABSTRACT: (U) Let X sub $i = 1, \dots, n$ be i.i.d. approximately F sub θ where F sub $\theta(x) = F(x-\theta)$ for some F that has median equal to 0. F is assumed unknown or only partially known, and the problem is to estimate θ . Priors are put on the pair (F, θ) . The priors on F concentrate all their mass on c.d.f.s with median equal to 0. These priors include 'Dirichlet-type' priors. The marginal posterior distribution of θ given X sub $1, \dots, X$ sub n is computed. The mean of the posterior is taken as the estimate of θ . (Author)

DESCRIPTORS: (U) *NONPARAMETRIC STATISTICS, *ESTIMATES, COMPUTATIONS, BAYES THEOREM, REPRINTS

IDENTIFIERS: (U) *Medium(Statistics), PE81102F, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 115 12/1

MISSOURI UNIV-ROLLA DEPT OF MATHEMATICS AND STATISTICS

(U) Statistical Analysis of a Compound Exponential Failure Model.

86 18P

PERSONAL AUTHORS: Engelhardt, Max ; Bain, Lee J. ;

CONTRACT NO AFOSR-84-0184

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0378

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical Computation and Simulation, v23 p289-315 1988.

ABSTRACT: (U) This paper discusses the statistical analysis of a two parameter compound exponential failure model. Some computational aspects of estimating both parameters by the method of maximum likelihood are discussed and small-sample means and variances are derived. Tests of hypotheses on each parameter with the other parameter an unknown nuisance parameter are provided. Also the construction of confidence limits are discussed (Author)

DESCRIPTORS: (U) *PARAMETRIC ANALYSIS, *EXPONENTIAL FUNCTIONS, *MAXIMUM LIKELIHOOD ESTIMATION, MATHEMATICAL MODELS, CONFIDENCE LIMITS, REPRINTS

IDENTIFIERS: (U) WJAFOSR2304A5, PEB1102F

AD-A170 115

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AD-A170 112

PAGE 98 EVN34M

AD-A170 112 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Stochastic Convexity and Its Applications.

DESCRIPTIVE NOTE: Technical rept..

DEC 85 35P

PERSONAL AUTHORS: Shaked, Moshe ; Shanthikumar, J. G. ;

CONTRACT NO. AFOSR-84-0205

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0345

UNCLASSIFIED REPORT

ABSTRACT: (U) Several notions of stochastic convexity and concavity and their properties are studied in this paper. Efficient sample path approaches are developed in order to verify the occurrence of these notions in various applications. Numerous examples are given. The use of these notions in several areas of probability and statistics is demonstrated. In queueing theory, the convexity (as a function of c) of the steady state mean waiting time in a GI/D/c queue, and as a function of the arrival and service rates in a GI/G/1 queue, is established. Also the convexity of the queue length in the M/M/c case as a function of the arrival rate is shown, thus strengthening previous results while simplifying their derivation. In reliability theory, the convexity of the payoff on the success rate of an imperfect repair is obtained and used to find an optimal repair probability. Also the convexity of the damage as a function of time in a cumulative damage shock model is shown. In branching processes, the convexity of the population size as a function of a parameter of the offspring distribution is proved. In nonparametric statistics, the stochastic concavity (convexity) of the empirical distribution function is established. And, for applications in the theory of probability inequalities, we identify several families of distributions which are convexly parametrized.

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, ARRIVAL.

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

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DISTRIBUTION FUNCTIONS, INEQUALITIES, MEAN, NONPARAMETRIC
STATISTICS, OPTIMIZATION, PROBABILITY, QUEUEING THEORY,
RATES, STABILITY, REPAIR, SIZES(DIMENSIONS), STEADY
STATE, THEORY, TIME DEPENDENCE, POPULATION(MATHEMATICS)

IDENTIFIERS: (U) *Convexity, Concavity. WUAFDSR2304A5,
PE81102F

AD-A170 111 9/2

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) Dynamic, Distributed Resource Configuration on SW-
Banyans.

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 85,

85 8P

PERSONAL AUTHORS: Foo, John ; Jeneveln, Roy ; Browne, J. C. ;

CONTRACT NO. F49620-84-C-0020

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-88-0482

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE, p268-273 1985.

ABSTRACT: (U) A distributed, Log N algorithm to
configure computer resources interconnected by regular SW-
banyans into logical SIMD machines is presented. The
algorithm is written for a general, dynamic computing
environment in which requests for resources and the
release of allocated resources occur spontaneously. A
request is always satisfied assuming it is physically
possible to do so. The circuit built is the cheapest
realization of the request in terms of network
connectivity.

DESCRIPTORS: (U) *CONFIGURATIONS, *COMPUTER ARCHITECTURE,
ALGORITHMS, DISTRIBUTION, ENVIRONMENTS, NETWORKS,
RESOURCES, MULTIPROCESSORS, REPRINTS

IDENTIFIERS: (U) *Banyans, WUAFDSR2304A3, PE81102F

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DTIC REPORT BIBLIOGRAPHY. SEARCH CONTROL NO. EVN34M

AD-A170 110 12/1

GEORGIA INST OF TECH ATLANTA

(U) Optimal Idle and Inspection Periods for M/G/1 Queues.

MAR 86 13P

PERSONAL AUTHORS: Kim, Sung S.; Sarfozo, Richard F.;

CONTRACT NO AFOSR-84-0367

PROJECT NO. 2304

TASK NO. 23

MONITOR: AFOSR 84-0362

UNCLASSIFIED REPORT

ABSTRACT: (U) We consider an M/G/1 queue that operates under a (1, n) policy: whenever the system becomes empty, the server is idle for a time T and then it inspects the queue continuously without serving customers until there are N customers waiting - thereupon the server is activated in service and serves customers continuously until the system becomes empty. This idle-inspection-service cycle is repeated indefinitely. There are costs for inspecting the queue, activating and running the server, and holding customers in the system. We present a computational procedure for determining the design parameters (T, N) that minimizes the average cost.

DESCRIPTORS: (U) *QUEUEING THEORY, COMPUTATIONS, COSTS, POLICY, PARAMETERS, NUMERICAL METHODS AND PROCEDURES

IDENTIFIERS: (U) WJAFOSR2304A5, PEB1102F

AD-A170 110

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AD-A170 109 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Stationary Markov Sets.

DESCRIPTIVE NOTE: Technical rept..

APR 86 39P

PERSONAL AUTHORS: Takser, Michael I.;

REPORT NO. FSU-STATISTICS-M708, TR-86-187-AFOSR

CONTRACT NO. F49620-86-C-0007

PROJECT NO. 2304

MONITOR: AFOSR TR-86-0368

UNCLASSIFIED REPORT

ABSTRACT: (U) A Markov set is a random set on a real line whose 'future' shape is conditionally independent of the 'past' shape given 'present'. Such sets appear in the study of visiting times of special Markov (but not strong Markov) processes. If the Markov process is stationary then the corresponding set is also stationary, that is, its distribution does not depend on the choice of the origin on the real line. In this paper we will describe all closed stationary Markov sets. We will show that each stationary Markov which is not regenerative can be constructed from two special regenerative sets by either taking a mixture of these regenerative sets or taking a 'superposition' of two regenerative sets. Superposition can be described loosely as cutting two real lines R1 and R2 with two sets M1 and M2 in them, into pieces of 1/d length and then combine them into one line alternating pieces from R1 and R2. The union of the cut offs from M1 and M2 will be the superposition of the sets M1 and M2.

DESCRIPTORS: (U) *MARKOV PROCESSES, *SET THEORY, REGENERATION(ENGINEERING), MATHEMATICAL FILTERS, MAPPING(TRANSFORMATIONS), REPRINTS

IDENTIFIERS: (U) PEB1102F

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 101 12/1 14/4 14/1
 FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
 (U) Testing whether F is 'More NBU (New Better Than Used)' Than 1.0.

86 8P

PERSONAL AUTHORS: Hollander, Myles ; Park, Dong H. ; Proschan, Frank ;

CONTRACT NO. F49820-88-C-0007

PROJECT NO. 2304

TASK NO. AS

MONITOR: AFOSR
 TR-88-0384

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Microelectronic Reliability.
 V28 n1 p. 44 1986.

ABSTRACT: (U) This paper develops a test to decide whether a life distribution possesses more of the new better than used (NBU) property than does a second life distribution. We also extend the test to compare more than two life distributions as to their degree of NBU-ness.

DESCRIPTORS: (U) *LIFE TESTS. *STATISTICAL ANALYSIS. PROBABILITY DISTRIBUTION FUNCTIONS. ASYMPTOTIC SERIES. *MAINTENANCE. COST ANALYSIS. RELIABILITY. REPRINTS

IDENTIFIERS: (U) NBU(New Better Than Used).
 WUAFOSR. 4-5, PE81102F

AD-A170 101

UNCLASSIFIED

AD-A170 098

AD-A170 098 9/2
 ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) A General Software Availability/Reliability Model: Numerical Exploration via the Matrix Laguerre Transform.

DESCRIPTIVE NOTE: Technical rept..

DEC 84 35P

PERSONAL AUTHORS: Masuda, Yasuaki ; Shanthikumar, D. G. ; Sumita, Ushio ;

CONTRACT NO. AFOSR-84-0208, NSF-ECS84-04071

PROJECT NO. 2304

TASK NO. AS

MONITOR: AFOSR
 TR-88-0402

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, a new software availability/reliability model is developed where lifetimes and repair times have general system-state-dependent distributions. Multiple errors may be introduced or removed through repairs. The model is formulated as a multivariate Markov process and contains many other models appeared in the literatures as special cases. The exponentiality assumption prevalent in the literature is totally eliminated. Expressions of various performance measures of practical interest combining availability and reliability of the software system at time t are derived. Using the matrix Laguerre transform of Sumita (1984), corresponding computational procedures are also developed. A numerical example is given, demonstrating speed, accuracy and stability of these procedures. (Author)

DESCRIPTORS: (U) *COMPUTER PROGRAM RELIABILITY. REPAIR. AVAILABILITY. MULTIVARIATE ANALYSIS. MARKOV PROCESSES. LAGUERRE FUNCTIONS. TRANSFORMATIONS(MATHEMATICS)

IDENTIFIERS: (U) WUAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 087 9/2

AD-A170 088 7/3 20/2

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) TRAC (Texas Reconfigurable Array Computer). An Experience with a Novel Architectural Prototype.

(U) Structure of 6,6,10,10-Tetranitro-pentacyclo(B,3,0,0 superscript 2,5,0 superscript 3,9,0 superscript 4,8) decane, C10H8N4O8.

DESCRIPTIVE NOTE. Final rept. 1 Feb 84-31 Jan 85.

85 13P

85 5P

PERSONAL AUTHORS: Deshpande, S. R.; Jenevein, R. M.; Lipo, A. G.

PERSONAL AUTHORS: George, Clifford; Gilardi, Richard; Filippen-Anderson, Judith L.; Choi, Chang S.; Chand, Alan P.

CONTRACT NO. F43620-84-C-0020

CONTRACT NO. AFOSR-84-0085

PROJECT NO. 204

PROJECT NO. 230J

TASK NO. A3

TASK NO. B2

MONITOR: AFG

MONITOR: AFOSR

TR 0458

TR-88-0388

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in National Computer Conference. p247-288 1985

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, Section C, VC41 p788-791 1985.

ABSTRACT: (U) This paper presents a self-assessment of the Texas Reconfigurable Array Computer (TRAC) Project. Architectural decisions and implementation schemes are examined, and staff is focused on elements such as processor-to-array design, along with the structure of the interconnection networks. Communication issues concerning circuit vs. packet switching and system synchronization are reviewed. Various test and debugging tools employed during the implementation phase are covered. Finally, now that TRAC is operational, overall positive and negative aspects of the design decision are summarized. (Author)

DESCRIPTORS: COMPUTER ARCHITECTURE, SYSTEMS ANALYSIS, PROGRAM TYPES, DEBUGGING(COMPUTERS), CIRCUIT INTERCONNECTIONS, REPRINTS

DESCRIPTORS: (U) CRYSTAL STRUCTURE, DECANES, POLYCYCLIC COMPOUNDS, NITRO RADICALS, ENERGETIC PROPERTIES, CRYSTAL LATTICES, REFLECTION, THERMAL PROPERTIES

IDENTIFIERS: (U) TRAC(Texas Reconfigurable Array Computer), MILFOSR2304A3, PE81102F

IDENTIFIERS: (U) Cubanes, Cubane/tetranitrocubane, X-ray crystallography, PE81102F

AD-A170 087

AD-A170 085

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(U)CLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 094 12/1

AD-A170 082 12/1

MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS
STATISTICS AND COMPUTER SCIENCE

(U) A Fast Spectral Goodness of Fit Test for Time Series Models

(U) A Family of Locally Resistant Nonsymmetric Bib Designs of Degree k.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Interim rept.,

AUG 85 20P

FEB 86 12P

PERSONAL AUTHORS: Kedem, Benjamin;

PERSONAL AUTHORS: Hedayat, A.; Ohmori, H.;

REPORT NO. MO-85-38-2K, TR85-32

REPORT NO. RR-86-01

CONTRACT NO. AFOSR-82-0187

CONTRACT NO. AFOSR-85-0320

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. 45

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR
TR 86-0408

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The oscillatory appearance of stationary time series is captured very economically by only a few higher order crossings which in addition contain a great deal of spectral content of the process. A useful approximation to the variances of higher order crossings is discussed and is applied in construction of probability limits for the hypothesized higher order crossing. From this, a graphical display of higher order crossing together with their probability limits provide a fast goodness of fit test. Examples illustrate the applicability of this device. (Author)

DESCRIPTORS: (U) *FITTING FUNCTIONS(MATHEMATICS), *TIME SERIES ANALYSIS, STATIONARY, APPROXIMATION(MATHEMATICS), PROBABILITY, MATHEMATICAL MODELS

IDENTIFIERS: (U) *Goodness of fit tests, Higher order crossing, PE81102F, WJAFOSR2304A5

ABSTRACT: (U) The existence of a symmetric BIB(4t+3, 2t+1, t) design implies the existence of a locally resistant BIB(4t+4, 8t+6, 4t+3, 2t+2, 2t+1) design of degree 2t+2. There are infinite number of such designs. Such designs are useful for running experiment under hostile circumstances where there are good chance of losing one or more observations. Such designs will preserve the statistical optimality of the data. Other theoretical results are also given. (Author)

DESCRIPTORS: (U) *EXPERIMENTAL DESIGN, SYMMETRY, STATISTICAL DATA, OPTIMIZATION, MATRICES(MATHEMATICS)

IDENTIFIERS: (U) BIB(Balanced Incomplete Block), PE81102F, WJAFOSR2304A5

AD-A170 082

AD-A170 082

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 091 12/1 12/2

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS
STATISTICS AND COMPUTER SCIENCE

(U) Optimal Allocation of Multistate Components

DESCRIPTIVE NOTE: Technical rept.,

SEP 85 14P

PERSONAL XRS: El-Newehi, Emad ; Proschan, Frank ;
Sethuram Jayaram ;

REPORT NO IR-85-4

CONTRACT / AFOSR-80-0170

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0424

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper presents some results in the optimal allocation of multistate components to k series systems that some performance characteristic like expected number of systems functioning at level alpha or higher, probability that at least one of the systems function at level alpha or higher, etc. is maximized. Our basic analytical tools are majorization and Schur function. These results may be used to obtain fruitful applications in reliability theory.

DESCRIPTIVE (U) *RELIABILITY, *OPTIMIZATION,
*MATHEMATICAL ANALYSIS, ALLOCATIONS

IDENTIFIER (U) Schur functions, Majorization, PE81102F,
WUAFOSR-145

AD-A170 091

AD-A170 078

UNCLASSIFIED

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CALIFORNIA UNIV RIVERSIDE DEPT OF STATISTICS

(U) Influential Nonnegligible Parameters under the Search Linear Model.

DESCRIPTIVE NOTE: Interim rept.,

APR 88 18P

PERSONAL AUTHORS: Ghosh, Subir .

CONTRACT NO. AFOSR-88-0048

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0438

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper some results useful in detecting the influential Nonnegligible parameters under the search linear model are presented. An estimator of the number of nonnegligible parameters which are significant and influential is also given. Keywords: factorial experiments; residuals. (Author)

DESCRIPTORS: (U) *PARAMETRIC ANALYSIS, *FACTORIAL DESIGN, ESTIMATES, MATHEMATICAL MODELS, LINEARITY, RESIDUALS

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 072 12/1

AD-A170 072 8/13 8/11 20/1.

PITTSB: UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

APPLIED RESEARCH ASSOCIATES INC ALBUQUERQUE NM

(U) On the Consistency of Regression Coefficients when the Errors are not Independently and Locally Distributed.

(U) Computational Aspects of the ARA Three Invariant Constitutive Model.

MAR 88 28P

DESCRIPTIVE NOTE: Final rept. 1 Aug 84-31 Jul 85.

MAY 88 134P

PERSONAL AUTHORS: Wu, Yuehua ;

PERSONAL AUTHORS: Dass, William C.; Merkley, Douglas H. ;

REPORT NO. TR-88-08

REPORT NO. 5834

CONTRACT NO. F49620-85-C-0008

CONTRACT NO. F49620-84-C-0086

PROJECT NO. 2304

PROJECT NO. 2307

TASK NO. A5

TASK NO. C1

MONITOR: AFOSR TR-88-0383

MONITOR: AFOSR TR-88-0483

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the author proposes two methods for estimation of the regression coefficients when the errors are not distributed identically and independently and are of nonzero mean. The estimates provided in this paper are shown to be strongly consistent and mean square consistent.

ABSTRACT: (U) The three invariant elastoplastic constitutive model has been implemented for use in finite difference blast and shock calculations. The model employs two yield surfaces with an independent plastic potential to control shear induced dilatancy. The model is conceptually similar to Lode's cohesionless soil model. Several improvements in the original ARA model have been incorporated during the course of implementation including tensile strength, expansive strain tracking during tensile failure, optional elimination of work softening, and a high pressure-temperature equation of state. Strain subcycling has been used to prevent violation of the consistency condition. Results are given for planar, spherical, and cylindrical one dimensional wave propagation, and are compared with results using several other currently available constitutive models. Two dimensional DIHEST calculation results are also shown. These calculations employed a newly developed interface between the Soil Element Model (SEM) subroutines and STEALTH 2D. This approach allows the SEM to act as a central bank of material models for potentially any number of continuum codes. Overall, the new constitutive model is physically realistic, somewhat expensive to run, and promising for future application. Steps which remain

DESCRIPT: ESTIMATES, NUMERICAL METHODS AND COEFFICIENTS, DISTRIBUTION, LINEAR ANALYSIS, MATHEMATICAL MODELS, CHEBYSHEV POLYNOMIALS, CORRELATION, ERRORS, CONSISTENCY

IDENTIFIER: (U) WJAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 072 CONTINUED

to make the parameter sensitivity studies to help dynamic instabilities, improved algorithms for eliminating numerical errors, a reasoning procedure, and more two dimensional simulation experience.

DESCRIPTORS: SOIL MECHANICS, *SOIL MODELS, *SEISMIC WAVES, WAVE AGATION, BLAST WAVES, SHOCK WAVES, FINITE DIFFERENCE METHOD, TENSILE STRENGTH, FAILURE(MECHANICS), TWO DIMENSIONAL ALGORITHMS, ALLUVIUM

IDENTIFIERS: SEM(Soil Element Model), PE81102F, WUAFOSR2307

AD-A170 071 20/4 21/2

GEORGIA INST OF TECH ATLANTA SCHOOL OF AEROSPACE ENGINEERING

(U) Evaluation of Data on Simple Turbulent Reacting Flows.

DESCRIPTIVE NOTE: Interim scientific report. 1 Oct 84-30 Sep 85.

SEP 85 478P

PERSONAL AUTHORS: Strahle, Warren C.; Lekoudis, Spyridon G.

CONTRACT NO. AF1SR-83-0356

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-85-0880

UNCLASSIFIED REPORT

ABSTRACT: (U) A large number of data sets on simple turbulent reacting and non-reacting flows are reviewed with a view toward judgement as to their suitability for computational test. Both premixed and nonpremixed flows are considered, but the review is limited to simple geometries and flows which could be analytically treated as an initial value (parabolic) problem. Nine flows are identified as being sufficiently well documented and understood to serve as bases for testing of computational methods and models. The data for these flows are tabulated or graphically displayed in this report.

DESCRIPTORS: (U) *TURBULENT FLOW, *COMBUSTION, BOUNDARY LAYER FLOW, SHEAR PROPERTIES, REYNOLDS NUMBER, FLAMES, PRESSURE GRADIENTS, JET FLOW, DATA REDUCTION, TABLES(DATA), GRAPHS

IDENTIFIERS: (U) Initial value problems, Premixed combustion, PE81102F, WUAFOSR2308A1

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AD-A170 071

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AD-A170 070 5/10 8/18 8/18 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M AD-A170 070 CONTINUED

BERNARD M. BUCH COLL NEW YORK PSYCHOPHYSIOLOGY LAB

(U) Psychological Studies II. Performance and Physiological Response in Coronary Prone and Noncoronary Prone Individuals.

DESCRIPTIVE NOTE: Final report. 1 Nov 84-31 Oct 85.

JAN 88 84P

PERSONAL AUTHORS: Andreassi, John L.; Juszczak, N. Mauro.

CONTRACT NO AFOSR-83-0304

PROJECT NO 2313

TASK NO. A4

MONITOR: Z. SR
78-0481

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A151 012

ABSTRACT: This final report details the background, findings, and conclusions of two studies completed in the Psychophysiology Laboratory of Baruch College, City University of New York, over the past twelve months. In Experiment I 38 individuals, 18 classified as Type A and 18 as Type B, using the Jenkins Activity Survey, performed a perceptual motor task (simulated race car driving) along with a secondary task (simple reaction time) while a number of physiological measures were obtained. The measures included heart rate (HR), electromyogram (EMG) and skin temperature (ST). Analyses of performance results indicated that Type A individuals significantly slowed their reaction times (secondary task) when performing qualifying trials compared to practice trials. Experiment II tested a different sample of 38 subjects (18 each of Type A and B) in a design which compared the effects of participation in both a perceptual-motor and a cognitive (short term memory) task. The results showed that Type A subjects produced faster RT responses than Type Bs, but only when engaged in the cognitive task. The As also outperformed the Bs in the cognitive task. In general, the cognitive task seemed to absorb more of the subjects' attention since RTs were significantly slower in the

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cognitive as compared to the perceptual-motor one. The Type As also had significantly higher skin conductance than Bs, although this was not differentiated according to task. An interesting finding here is that while SC is higher for As than Bs, skin temperature (ST) is also higher.

DESCRIPTORS: (U) PSYCHOPHYSIOLOGY, *PERFORMANCE(HUMAN), *RESPONSE(BIOLOGY), *PERCEPTION, *MOTOR REACTIONS, *MEMORY(PSYCHOLOGY), STRESS(PSYCHOLOGY), STRESS(PSYCHOLOGY), COGNITION, HEART RATE, ELECTROMYOGRAPHY, SKIN(ANATOMY), BODY TEMPERATURE, REACTION TIME, TEST METHODS, CORONARY DISEASE, EXPERIMENTAL DATA, STIMULATION(PHYSIOLOGY), ELECTROPHYSIOLOGY

IDENTIFIERS: (U) PEB1102F, WUAFOSR2313A4

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DTIC REPORT BIBLIOGRAPHY SLARCH CONTROL NO. EVN34M

AD-A170 089 3/1

AD-A170 089 CONTINUED

GEORGIA STATE UNIV ATLANTA DEPT OF PHYSICS AND ASTRONOMY

(U) Astronomical Observations by Speckle Interferometry.

DESCRIPTIVE TITLE: Final rept. 1 Jun 81-28 Feb 88.

JUN 88 141P

PERSONAL ADDRESS: McAllister, Harold A.

CONTRACT NO. AFOSR-81-0161

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR 88-047B

UNCLASSIFIED REPORT

ABSTRACT: 1). Speckle Interferometry is a method which permits the extraction of spatial information from two dimensional images at scales down to the diffraction limit of the telescope in spite of severe blurring introduced by atmospheric turbulence. With existing large telescopes, speckle techniques thus permit resolution at spatial scales of 0.025 arcseconds rather than the 1 to 2 arcseconds associated with classical techniques. These methods are also characterized by enhanced measurement accuracy and the separation of closely spaced objects seen through a turbulent atmosphere. The speckle Interferometry system incorporates an intensified charge coupled device array as the primary imaging detector and a hardwired autocorrelator as a high speed data reduction process operating at video rates. The analysis of the reduced data is carried out using a digital image processing system. The goals of these programs include: the detection of planetary mass objects in orbit about one component of a widely separated binary star system through measurement of submotions in the otherwise elliptical motion of binary stars; the observation of asteroids with the goal of definitely answering the question of the duplicity of these primordial members of the solar system; the resolution of suspected structure in the nuclei of active galaxies and quasars; the reconstruction of truly diffraction limited images of a variety of astronomical objects; and, the generation of

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data applicable to a better understanding of the characteristics of atmospheric turbulence and its effects on high resolution imaging.

DESCRIPTORS: (U) *ASTRONOMY, *OPTICAL INTERFEROMETERS, *INTERFEROMETRY, BINARY STARS, PLANETS, INTERSTELLAR SPACE, HIGH RESOLUTION, ASTEROIDS, DWARF STARS, IMAGE PROCESSING, DIFFRACTION ANALYSIS, CHARGE COUPLED DEVICES, DIGITAL SYSTEMS

IDENTIFIERS: (U) *Speckle Interferometry, Digital Images, PEB1102F, WJAFOSR:311A1

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DTIC REPORT BIBLIOGRAPHY

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AD-A170 065 7/2

AD-A170 065 8/16

ILLINOIS UNIVERSITY AT URBANA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

BAYLOR COLL OF MEDICINE HOUSTON TX

(U) Research on a New Type of Negative Hydrogen Ion Source.

(U) Amino Neurotransmitter Regulation of Long-Term Synaptic Plasticity in Hippocampus.

DESCRIPTIVE NOTE: Final rept. 15 Jul 81-14 Jan 85.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 85-31 Mar 86.

MAY 86 82P

APR 86 11P

PERSONAL AUTHORS: Turnbull, R. J. ;

PERSONAL AUTHORS: Johnston, Daniel ;

CONTRACT NO. AFOSR-81-0160

CONTRACT NO. AFOSR-85-0178

PROJECT NO. 2301

PROJECT NO. 2312

TASK NO. A7

TASK NO. 48

MONITOR: AFOSR
TR-86-0476MONITOR: AFOSR
TR-88-0485

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The production of negative hydrogen ions in a discharge is greatly enhanced if the hydrogen is vibrationally excited hydrogen. In the work presented here is a study of a method of producing vibrationally excited hydrogen. The technique used is to heat dense hydrogen not enough to produce vibrational excitation and then allow it to expand thus cooling it while maintaining the vibrational excitation. Both theoretical calculations and experimental results on this technique are presented.

DESCRIPTORS: (U) *HYDROGEN, *ANIONS, ION SOURCES, PREPARATION, EXCITATION, LASERS, HEATING, MOLECULAR VIBRATION, GASES, ELECTRIC ARCS, DISSOCIATION, VACUUM CHAMBERS, NOZZLE GAS FLOW, ELECTRONIC STATES, ENERGY LEVELS, FABRICATION

IDENTIFIERS: (U) PE81102F, WUAFOSR2301A7

ABSTRACT: (U) The overall goal of the research project is to investigate the mechanisms of long-term synaptic potentiation (LTP) in hippocampus, with particular emphasis on the modulation of LTP by amine neurotransmitters. During the first year of the grant, it was shown that LTP of the mossy fiber synapse in hippocampus is associated with an increase in the excitatory synaptic conductance with no change in reversal potential or membrane properties of the postsynaptic neuron. It was also shown that no long-term change in the inhibitory synaptic conductance was associated with LTP at the mossy fibers. In other work, various hypotheses associated with the previously observed modulation of LTP by norepinephrine (NE) were tested. It was found that cyclic AMP could mimic the action of NE and that NE could enhance LTP in the absence of synaptic inhibition. The cellular effects of NE were explored in an isolated hippocampal neuron system in which patch-clamp techniques were utilized. It was found that NE produced an enhancement in the voltage-dependent calcium current. Progress also was made towards the development of a computer model that simulates the behavior of single hippocampal neurons.

DESCRIPTORS: (U) *NEUROCHEMICAL TRANSMISSION, *SYNAPSE, *HIPPOCAMPUS, AMINES, ADRENAL MEDULLA HORMONES, PLASTIC

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AD-A170 065 CONTINUED DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M
 AD-A170 063 20/12
 PROPERTIES OF FIBERS, ADENOSINE PHOSPHATES, CYCLIC NUCLEOTIDES, CALCIUM, ELECTROPHYSIOLOGY, AND CELLULAR REGULATION
 IDENTIFIERS: Norepinephrine, AMP/Adenosine, Cyclic AMP, LTP(Long Term Synaptic Potentiation) PE81102A, WUAFOSR231248
 (U) Development of a Planar Heterojunction Bipolar Transistor for Very High Speed Logic.
 DESCRIPTIVE NOTE: Annual technical rept. no. 3, 1 Oct 84-1 Mar 86.
 MAR 86 55P
 PERSONAL AUTHORS: Long, Stephen I.; Kroemer, Herbert; Rao, M. A.;
 CONTRACT NO. AFOSR-82-0344
 PROJECT NO. 2305
 TASK NO. C1
 MONITOR: AFOSR TR-88-0487

UNCLASSIFIED REPORT

ABSTRACT: (U) The following report describes the results of research on III-V molecular beam epitaxial (MBE) growth, material characterization and the fabrication of heterostructure bipolar transistors (HBT) for very high speed logic applications. During the reporting period work on the InGaP/GaAs heterojunction (HJ) was completed. Isotype HJs were grown and evaluated by a CV reconstruction method in order to determine the energy band offsets. It was found that $E_c=0.21$ eV and $E_v=0.25$ eV for the lattice matched composition. A new direction toward improvement in performance and the fabrication techniques for the AlGaAs/GaAs HBT was successfully demonstrated. Graded-bandgap nonalloyed ohmic contacts using n+ InAs and GaAs for the AlGaAs emitter and p+ GaSb for the GaAs base were provided by selective epitaxial regrowth. The MBE growth conditions for grading from GaAs to InAs to GaSb were determined. Low specific contact resistances were observed for both contact types. A AlGaAs/GaAs graded-gap contact HBT was grown. A current gain of 20 was measured with only simple wire probes on the base and emitter.

DESCRIPTORS: (U) *BIPOlar TRANSISTORS, *HETEROJUNCTIONS,

AD-A170 063

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 059 CONTINUED

*FABRICATION, EPITAXIAL GROWTH; MOLECULAR BEAMS, GALLIUM ARSENIDE; INDIUM PHOSPHIDES, ALUMINUM GALLIUM ARSENIDE, GALLIUM ARSENIDES

IDENTIFIERS: (U) Indium gallium phosphide
HBT (Heterostructure Bipolar Transistors), WUAFSR2305C1,
PE81102F

AD-A170 059 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Almost Sure L(1)-Norm Convergence for Data-Based Histogram Density Estimates.

DESCRIPTIVE NOTE: Technical rept.,

MAR 88 17P

PERSONAL AUTHORS: Chen, X. R.; Zhao, L. C. ;

REPORT NO. TR-88-07

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0394

UNCLASSIFIED REPORT

ABSTRACT: (U) The main result of this paper is summarized in Theorem 1, which states that when certain conditions of a general nature are satisfied, the data-based histogram density estimator is strongly consistent in the sense that the mean absolute deviation of the estimator and the density function converges to zero almost surely for any density function, as the sample size increases to infinity. (Author)

DESCRIPTORS: (U) *HISTOGRAMS, *ESTIMATES, DENSITY, RANDOM VARIABLES, DISTRIBUTION FUNCTIONS, CONVERGENCE, MULTIVARIATE ANALYSIS

IDENTIFIERS: (U) *Histograms density eslim, PE81102F, WUAFOSR2304A5

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AD-A170 087

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AD-A170 058

12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Easily Stated but Hard Statistical Problems.

(U) On Mappings between Covariance Matrices and Physical Systems.

DESCRIPTIVE NUMBER Technical rept.,

85 13P

MAY 86 2UP

PERSONAL AUTHOR: Hollander, Mylez ;

PERSONAL AUTHORS: Kallath, T. ; Lev-Ari, H. ;

REPORT NO. F11 STATISTICS-W727, TR-88-188-AFUSR

CONTRACT NO. DAAG29-83-K-0028, AFOSR-83-0228

CONTRACT NO. F49820-85-C-0007

PROJECT NO. 4304

PROJECT NO. 2304

MONITOR: AFOSR
TR-88-0442

MONITOR: AFOSR
TR-88-0404

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This is an expository paper written in response to an invitation to give a non-technical talk in a session devoted to 'Practical Aspects of Statistics' at the 1986 Annual Statistical Meetings. The goal of the session is to encourage interest in statistics among non-statisticians. The author chose to describe three problems of current research interest. The problems have the feature that they can be stated in a relatively easy fashion. The solutions however are difficult. References to partial solutions are given; all three problems have aspects that remain unsolved and are currently under study. The problem of Section 2 deals with survivorship data and concerns estimation of average remaining life. Section 3 considers a problem that pertains to assessing the degree of similarity between species' presence or absence on islands. Section 4 presents a problem in geometrical probability. To conform to the spirit of the session, I have chosen to describe the problems in words, de-emphasizing symbols and mathematics and aiming for the non-statistician. (Author)

DESCRIPTORS: (U) *STATISTICS, ESTIMATES, PROBLEM SOLVING, LIFE EXPECTANCY(SERVICE LIFE), TABLES(DATA)

IDENTIFIERS: (U) PE81102F

AD-A170 057

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SUPPLEMENTARY NOTE: Pub. in Contemporary Mathematics, v47 p241-242 1985.

ABSTRACT: (U) In different contexts, several authors have established biunique mappings between positive definite Toeplitz kernels (or operators) and self adjoint second order differential equations describing physical systems such as vibrating strings and nonuniform transmission lines. To get in some sense a more complete picture of this mapping, it is necessary to extend it to mapping between families of non-Toeplitz operators and classes of physical systems. Each family contains a Toeplitz operator and all operators congruent to it in a certain sense; correspondingly, one adjoins different boundary conditions to the physical system associated with the Toeplitz operator. It is noted that the concept of displacement structure of operators is naturally related with the above results. Also that the generalized mapping leads to new classification of positive definite operators into 3 distinct classes, to generalizations of orthogonal polynomials and to new Christoffel Darboux formulas for fast algorithms for operator factorization, and to efficient new implementations for prediction and estimation filters.

DESCRIPTORS: (U) *MAPPING(TRANSFORMATIONS), MATRICES(MATHEMATICS), TRANSMISSION LINES, VIBRATION, LINEAR SYSTEMS, LEAST SQUARES METHOD, CONVOLUTION

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 052 CONTINUED

AD-A170 052 8/7 12/1

INTEGRAL KERNEL FUNCTIONS, ALGORITHMS,
OPERATIONS (MATHEMATICS), ORTHOGONALITY, REPRINTS

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR COMPUTER
SCIENCE

IDENTIFIERS: (U) Toeplitz matrices, Christoffel Darboux
formula AFOSR2304A15, PE81102F

(U) Layer by Layer Reconstruction Methods for the Earth
Resistivity from Direct Current Measurements.

NOV 85 11P

PERSONAL AUTHORS: Levy, Bernard C. ;

CONTRACT NO. AFOSR-82-0135

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-88-0448

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Geoscience and Remote Sensing, VGE-23 no p8-1-850 Nov 85.

ABSTRACT: (U) Several methods for reconstructing the
resistivity profile of a layered laterally homogeneous
earth from direct current measurements are described.
These methods recover the resistivity of the earth layer
by layer in a recursive way, and require a very small
amount of computational effort. They are obtained by
transforming the inverse resistivity problem into an
equivalent inverse scattering problem, and by applying
efficient signal processing algorithms such as the Schur,
fast Cholesky or Levinson recursions to the transformed
problem. These algorithms operate on a layer stripping or
layer accumulation principle, and are shown to be related
to previous reconstruction techniques of Pekeris, Koefoed,
Kunetz and Rocroi, and others.

DESCRIPTORS: (U) EARTH MODELS, ELECTRICAL RESISTANCE,
INVERSION, HOMOGENEITY, LAYERS, DIRECT CURRENT, DEPTH,
TRANSFORMATIONS (MATHEMATICS), RECURSIVE FUNCTIONS, SIGNAL
PROCESSING, ALGORITHMS, REPRINTS

IDENTIFIERS: (U) Earth resistivity, Inverse scattering,
Resistivity prospecting, Layered earth models,
Reconstruction methods, PE81102F, WUAFOSR2304A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 043 20/9 20/7 20/3 AD-A170 043 CONTINUED

TENNESSEE UNIVERSITY KNOXVILLE PLASMA SCIENCE LAB

(U) Investigation of RF Emissions from Two Beams Interacting with an Electric Field Dominated Plasma

DESCRIPTIVE TITLE: Final rept. 15 Mar 81-14 Mar 88.

MAY 86 110P

PERSONAL AUTHOR: Roth, J. M.

REPORT NO.: PSL-88-1

CONTRACT NO.: AFOSR-81-0083

PROJECT NO.: 101

TASK NO.: A3

MONITOR: AF 9 TR 13-0474

UNCLASSIFIED REPORT

ABSTRACT: (U) This final scientific report summarizes a five year program of experimental research on a steady state, electric field dominated, classical Penning discharge at the University of Tennessee's Plasma Science Laboratory. The objectives of this research program were to study RF emissions and RF interactions with a steady-state, electric field dominated plasma which exhibited instability associated with two interpenetrating electron beams. Among the scientific results of this contract are the observation and identification of the geometric mean emission frequency. The RF emissions associated with the geometric mean emission frequency and its harmonics could produce, under some conditions, a virtually flat white noise spectrum from below 0.5 megahertz to frequencies above 1.2 GHz. Quantitative investigations during the latter part of this contract showed that the efficiency of converting the dc electrical power input of the classical Penning discharge into broad band RF radiation was no more than 0.1 or 1.0%.

DESCRIPTORS: (U) *PLASMA OSCILLATIONS, *ELECTRON BEAMS, *MAGNETIC FIELDS, *ELECTRIC FIELDS, EMISSIONS, COUPLING (ACTION), RADIOFREQUENCY, TURBULENCE, KINETIC THEORY, TRANSPORT PROPERTIES, THESES

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IDENTIFIERS: (U) Diagnostics(Plasma), Magnetic pumping, Penning discharges, Steady state plasmas, Ion temperatures, Dual beam instabilities, Confinement(Plasma), Heating(Plasma), PE81102F, WUAFOSR2301A8

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 039 12/1

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED
MATHEMATICS AND STATISTICS

(U) A Note on Bayes Empirical Bayes Estimation by Means of
Dirichlet Processes.

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85.

SEP 85 21P

PERSONAL AUTHORS: Kuo, Lynn ;

REPORT NO AMS-85-80

CONTRACT NO AFOSR-84-0138

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0425

UNCLASSIFIED REPORT

ABSTRACT: (U) Bayes estimators are derived by means of
the Dirichlet process hyperprior approach for general
empirical Bayes problems. For any sample size, these
estimators are expressed concisely as ratios of two
multidimensional integrals. A numerical example on
Poisson sampling is given. Keywords: Bayesian
nonparametric density method; compound Poisson
distribution. (Author)

DESCRIPTORS: (U) ESTIMATES; DIRICHLET INTEGRAL;
POISSON PROBABILITY FUNCTIONS; STATISTICAL SAMPLES; BAYES
THEOREM; COMPARATIVE STATISTICS; RANDOM VARIABLES
STATISTICAL INFERENCE; MONTE CARLO METHOD

IDENTIFIERS: (U) Bayes estimators, PE81102F

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AD-A170 036 20/3

TEXAS A AND M UNIV COLLEGE STATION DEPT OF ELECTRICAL
ENGINEERING

(U) A Novel Differential Geometric Approach toward Robust
Signal Detection.

DESCRIPTIVE NOTE: Rept. for 23 May 85-22 May 86.

MAY 86 7P

PERSONAL AUTHORS: Thompson, M. W.; Halverson, D. R. ;

CONTRACT NO. AFOSR-82-0033

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0432

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at Conference on
Information and System Sciences, 19-21 Mar 86.

ABSTRACT: (U) We present a new approach toward robust
signal detection which is based on techniques rooted in
differential geometry. These methods, as opposed to the
commonly employed classical saddlepoint criteria, readily
admit the quantitative measure of the degree of robustness
over very general classes of admissible noise
distributions. Our approach thus is seen to make possible
investigations of the quantitative tradeoff between optimal
performance and robustness, and we illustrate the
application of this differential geometric approach via
various specific examples. (Author)

DESCRIPTORS: (U) SIGNAL PROCESSING; SIGNALS; DETECTION;
NOISE; REPRINTS

IDENTIFIERS: (U) robust signal detection, Robustness,
PE81102F

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 034 8/5 8/1 8/3

AD-A170 032 9/2

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF COMPUTER SCIENCE

(U) Immunological Dysfunctions and Abrogation of the Inflammatory Response by Environmental Chemicals

(U) Metaprogramming: A New Methodology for the Construction of Quality Software.

DESCRIPTIVE NOTE: Final rept. 1 Jul 83-31 Dec 85.

DESCRIPTIVE NOTE: Final rept. 18 Jun 81-14 Sep 84.

FEB 84 31P

JAN 86 13P

PERSONAL AUTHORS: Olsen, Richard G.

PERSONAL AUTHORS: Flon, Laurence; Cooperider, Lee; Horowitz, Ellis; Curran, Anne M.; Paradan, Thierry;

CONTRACT NO. F49620-83-C-0114

PROJECT NO. 2312

REPORT NO. 63-4510-1741

TASK NO. A5

CONTRACT NO. AFOSR-81-0199

MONITOR: AFOSR

PROJECT NO. 2304

TR 86-0488

UNCLASSIFIED REPORT

ABSTRACT (U) During this reporting period, further examples of 1,1-dimethylhydrazine (DMH) induced immunosuppression have been noted, and at least two possible mechanisms for immunoenhancement have been suggested. First, in vivo or in vitro exposure to DMH results in enhancement of the allogeneic mixed lymphocyte response, a measure of cell mediated immunity. Interference of certain macrophage functions by DMH has been demonstrated, such as decreased prostaglandin E2 production and chemiluminescence. Inhibition of these processes which are associated with macrophage related immunoregulation could explain the immunoenhancement induced by DMH. Preliminary experiments also suggest that enhanced interleukin 1 production by macrophages and interleukin 2 activity on cell proliferation, but that it inhibits interleukin 1 activity.

DESCRIPTORS (U) •DIMETHYLHYDRAZINES, •IMMUNITY, •ION, EXPOSURE (PHYSIOLOGY), IMMUNOLOGY, •LYMPHOCYTES, •PROSTAGLANDIN, CHEMILUMINESCENCE, IN VITRO ANALYSIS, IMMUNOSUPPRESSION

IDENTIFI (U) Interleukin 1, Interleukin 2, PE81102F, LPN 01763814/715387

AD-A170 034

AD-A170 032

UNCLASSIFIED

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UNCLASSIFIED REPORT

ABSTRACT: (U) There were three major contributions that came out of this research. The first was the development of a program development environment that permits software to be reused. The second was the development of techniques for the design and specification of concurrent programs. The third was a new method for writing programs that involves pictures. For each of these conditions a student Ph.D. thesis was produced. In particular Dr. Anne Curran worked on the first problem, Dr. Thierry Paradan worked on the second problem and Dr. Georg Raeder worked on the last problem. Since each of their contributions are radically different, this summary report is broken into three categories, each based upon their work.

DESCRIPTORS: (U) •COMPUTER PROGRAMMING, •COMPUTER PROGRAMS, REUSABLE EQUIPMENT, QUALITY CONTROL, SPECIFICATIONS, COMPUTER PROGRAM RELIABILITY, COMPUTER GRAPHICS, METHODOLOGY, SYSTEMS ENGINEERING, MODULAR CONSTRUCTION, HIGH LEVEL LANGUAGES, COMPUTER PROGRAM VERIFICATION, USER NEEDS, THESES

IDENTIFIERS: (U) Metaprogramming, ADA programming

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 030 CONTINUED

Language: PE01102F

AD-A170 030 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Detection of Outliers in Multivariate Linear Regression Model.

DESCRIPTIVE NOTE: Technical rept..

APR 86 10P

PERSONAL AUTHORS: Naik, Dayanand N. ;

REPORT NO. TR-88-11

CONTRACT NO. F4620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0359

UNCLASSIFIED REPORT

ABSTRACT: (U) This article suggests multivariate kurtosis measure as a statistic for detection of outliers in a multivariate linear regression model. The statistic has some local optimal properties. Keywords: Multivariate linear regression model; Detection of outliers; Multivariate kurtosis; and Locally best invariant test.

DESCRIPTORS: (U) *LINEAR REGRESSION ANALYSIS.
*MULTIVARIATE ANALYSIS. *RANGE(EXTREMES). DETECTION.
INVARIANCE MATHEMATICAL MODELS. VECTOR ANALYSIS

IDENTIFIERS: (U) *Outliers, Kurtosis, PE01102F

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UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY RESEARCH CONTROL NO. EVN34M
AD-A170 028 CONTINUED

AD-A170 028 20/9

STANFORD UNIVERSITY CA HIGH TEMPERATURE GASDYNAMICS LAB

(U) Fundamental Processes in Partially Ionized Plasmas.

DESCRIPTIVE REPORT: Annual scientific rept. 1 Feb 85-31 Jan 86.

FE. 28 82P

PERSONAL AUTH: Kruger, C. H.; Mitchner, M.; Self, S. A.

CONTRACT NO. FOSR-83 0108

PROJECT NO. 31

TASK NO.

MONITOR: A. T. 0342

UNCLASSIFIED REPORT

ABSTRACT: This research is directed to three major areas: recombination in molecular plasmas, discharge effects (electrode interaction) and interaction of fluid dynamics. Recombination and ionization are fundamental processes that play a role in many applications and natural phenomena that involve partially ionized plasmas. Under the present program, experiments have been designed and theoretical analyses conducted to obtain a better knowledge of the rates of recombination in the presence of molecular species. Studies are continuing of the near-electrode region and the processes by which current is transferred between the plasmas and the electrodes. The first stage of theoretical modeling of these processes has now been completed and published. A study of the interaction of discharges and fluid dynamics has measured the significant secondary flows caused by the interaction of a magnetic field with a current carrying plasma. Measurements have been made of secondary flows, and of their effect on profiles of axial velocity, turbulence intensity, and electrical conductivity.

DESCRIPTORS: PLASMAS (PHYSICS); RECOMBINATION REACTIONS; SECONDARY FLOW; ELECTRIC DISCHARGES; ELECTRODES; X-AXES; ELECTRICAL CONDUCTIVITY; ELECTRODES; ELECTRONS; FLUID DYNAMICS; INTENSITY.

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INTERACTIONS, IONIZATION, MAGNETIC FIELDS, MOLECULES, THEORY, TURBULENCE, VELOCITY, PLASMA SHEATHS, MAGNETOHYDRODYNAMICS, ANODES, CATHODES, BREAKDOWN (ELECTRONIC THRESHOLD)

IDENTIFIERS: (U) PE81102F

UNCLASSIFIED

OTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 025 12/1

AD-A170 024 8/1 8/3

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

ROCKEFELLER UNIV NEW YORK

(U) On Selection of Dimensionality under Multivariate Regression and Canonical Correlation Models

(U) Role of Protein Phosphorylation in Regulation of Bioreactivity.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 85-28 Feb 86.

APR 86 53P

PERSONAL AUTHORS: Krishniah, P. R. ;

MAR 86 10P

REPORT NO. TR-86-10

PERSONAL AUTHORS: Greengard, P. ;

CONTRACT NO. F49620-86-C-0008

CONTRACT NO. AFOSR-84-0086

PROJECT NO. 2304

PROJECT NO. 2312

TASK NO. A5

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR

TR-86-0343

TR-86-0467

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the author gives a review of the literature on various techniques for determination of the ranks of regression matrix and canonical correlation matrix. Also, methods of selection of important original variables under multivariate regression and canonical correlation models are reviewed. The methods reviewed involve not only tests of hypotheses but also model selection methods based upon information theoretic criteria. Keywords: Contingency tables; correlation; multivariate regression equations model; discriminant analysis; econometrics; likelihood ratio test; linear and structural relations; pattern recognition; random effects model. (Author)

DESCRIPTOR: (U) *REGRESSION ANALYSIS, *MULTIVARIATE ANALYSIS, *RELATION, *MATRICES/MATHEMATICS, *MATHEMATICAL MODELS, *PATTERN RECOGNITION, *ECONOMETRICS

IDENTIFIERS (U) PE61102F

ABSTRACT: (U) Four neuron-specific phosphoproteins ad calcium/calmodulin-dependent protein kinase II were used as model proteins to investigate the role of protein phosphorylation in the regulation of bioreactivity in the nervous system. These studies were carried out at the levels of electrophysiology, biochemistry, and molecular biology, in an attempt to obtain the dependent protein kinase II were pressure-injected into the preterminal digit of the squid giant synapse to test directly the possible regulation of neurotransmitter release by these substances. The binding of Synapsin I to small synaptic vesicles was examined. The mechanism of calcium/calmodulin-dependent protein kinase II autophosphorylation and its effect on the activity of the enzyme were studied. The regional and subcellular distributions of proteins Ila and IIb in the nervous system were determined. The regional and subcellular distributions of protein p38 in the nervous system were determined. A partial cDNA clone for Synapsin I was obtained.

DESCRIPTORS: (U) *PROTEINS, *PHOSPHORYLATION, *NEUROCHEMISTRY, *NEUROCHEMISTRY, *SYNAPSE, *CALCIUM, *PHOSPHORUS TRANSFERS, *NERVE CELLS, *RIBONUCLEIC ACIDS, *PROTEIN METABOLISM, *SUBSTRATES, *BIOCHEMISTRY, *CLONES.

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 024 CONTINUED

NUCLEOTIDES, OLIGONUCLEOTIDES, MOLECULAR BIOLOGY,
DEOXYRIBONUCLEIC ACIDS, CEPHALOPODA

IDENTIFIERS: (U) Phosphoproteins, WJAFOSR2312A2,
PE81102F

AD-A170 021 5/3 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC
PROCESSES

(U) On the Pricing of American Options.

DESCRIPTIVE NOTE: Technical rept. Sep 85-Aug 86.

MAY 86 28P

PERSONAL AUTHORS: Karatzas, Ioannis ;

REPORT NO. TR-137

CONTRACT NO. F49620-85-C-0144, NSF-DMS84-18738

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0443

UNCLASSIFIED REPORT

ABSTRACT: (U) In an important and relatively recent article Bensoussan presents a rigorous treatment of the pricing problem for contingent claims that can be exercised at any time before maturity. He adapts to this situation the Black & Scholes methodology of duplicating the cash flow from such a claim by managing skillfully a self-financing portfolio that contains only the basic instruments of the market, i.e., the stocks and the bond, and that entails no arbitrage opportunities before exercise. Under a condition on the market model called completeness Bensoussan shows that the valuation of such claims is indeed possible and characterizes the exercise time in terms of an appropriate optimal stopping problem. In the study of the latter, Bensoussan employs the so-called 'penalization method,' which forces rather stringent boundedness and regularity conditions on the payoff from the contingent claim. Such conditions are not satisfied, however, by the prototypical examples of such claims, i.e., American call options. The aim of this paper is to offer an alternative methodology on this problem, which is actually simpler and manages to remove the above restrictions.

DESCRIPTORS: (U) *MATHEMATICAL MODELS, *INVESTMENTS,

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AD-A170 024

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A170 021 CONTINUED

AD-A170 020 8/3 8/1

STOPPING (S(MATHEMATICS)), MATRICES(MATHEMATICS),
BROWNIAN (LW, FINANCIAL MANAGEMENT, VALUE

AT AND T BELL LABS INC MURRAY HILL NJ

IDENTIFIERS (U) 3ensoussan model, PE81102F,
WUAFOSR2, 115

(U) An Investigation Into the Effects of Peptide
Neurotransmitters and Intracellular Second Messengers
in Rat Central Neurons in Culture.

DESCRIPTIVE NOTE: Annual rept. 15 Oct 84-15 Oct 85.

MAY 86 82P

PERSONAL AUTHORS: Connor, John A. ;

CONTRACT NO. F49620-85-C-0009

PROJECT NO. 2312

TASK NO. K2

MONITOR: AFOSR
TR-88-0486

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress has been made in several areas of our research proposal. We have developed a Ca-imaging system which is now capable of resolving subcellular Ca changes on the order of seconds. This Ca-imaging system has been used to study neurotransmitter actions in culture diencephalic and cerebellar neurons. Both classical (GABA) and modulatory (thyroid hormone) neurotransmitters were found to affect cellular Ca^{2+} levels in these cells without depolarizing resting potential. We have also continued studies of second messenger action in identifiable molluscan neurons. The concentration of endogenous cyclic AMP in single cells was measured, and under stimulated conditions the levels were sufficient to suggest activation of cyclic AMP-induced membrane conductances.

DESCRIPTORS: (U) *NEUROCHEMICAL TRANSMISSION, *CALCIUM, *PEPTIDES, *NERVE CELLS, MEMBRANES(BIOLOGY), BRAIN, SYNAPSE, CEREBELLUM, ADENOSINE PHOSPHATES, AMINO ACIDS, BUTYRIC ACIDS, THYROID HORMONES, CATIONS, MOLLUSCA, ACTIVATION, HISTAMINE, CYTOCHEMISTRY, NERVE BLOCKING, RATS

IDENTIFIERS: (U) AMP(Adenosine Monophosphate),
GABA(Gamma Aminobutyric Acid), PE81102F, WUAFOSR2312K2

AD-A170 020

AD-A170 021

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 014 12/1

PITTSBURGH CIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Extreme Point Methods in the Study of Classes of Bivariate Distributions and some Applications to Contingency Tables.

DESCRIPTIVE NOTE: Technical rept..

APR 86 88P

PERSONAL AUTH: S. Subramanyam, K. Rao, M. B. .

REPORT NO. TR-88-12

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2104

TASK NO. A5

MONITOR: AF R TR 3-0358

UNCLASSIFIED REPORT

ABSTRACT: (U) The set of all bivariate positive distributions is neither compact nor convex. But the set of all bivariate positive quadrant distributions with fixed marginals is a convex set. These convex sets are compact in a case of discrete bivariate distributions. If the marginals have finite support. A simple method to enumerate extreme points of these convex sets is given. In context of contingency tables for testing the null hypothesis of independence against the alternative of positive quadrant dependence one can use the method of extreme point analysis to compare the performance of various tests. Keywords: Extreme point; Convex set; Compact set; Bivariate distributions; Positive quadrant dependence; Negative quadrant dependence; and power function of contingency tables.

DESCRIPTORS: (U) *BIVARIATE ANALYSIS, *DISCRETE DISTRIBUTIONS, CONVEX SETS, QUADRANTS, DISTRIBUTION

IDENTIFIERS: (U) Contingency tables, WUAF05R230304A5, FEB1102F

AD-A170 014

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AD-A170 004 9/2

MIAMI UNIV CORAL GABLES FLA PLASMA PHYSICS LAB

(U) Analysis of Fault Tolerant Computer Systems.

DESCRIPTIVE NOTE: Technical rept..

FEB 85 42P

PERSONAL AUTHORS: Sumita, Ushio; Shanthikumar, J. G.; Masuda, Yasushi;

CONTRACT NO. AFOSR-84-0205, NSF-ECS84-04071

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0403

UNCLASSIFIED REPORT

ABSTRACT: (U) In many critical applications of digital systems, fault tolerance has been an essential architectural attribute for achieving high reliability. In recent years, the concept of the performability of such systems has drawn the attention of many researchers. In this paper, we develop a general Markov model for fault tolerant computer systems. Various important performance measures, including the performability measures as well as some new performance measures, are treated in a unified manner. Furthermore general and efficient computational procedures are developed for calculating these performance measures based on the uniformization technique of Keilson (1974, 1979). A numerical example is given to illustrate the computational procedures developed. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *SYSTEMS ANALYSIS, DIGITAL COMPUTERS, MATHEMATICAL MODELS, MARKOV PROCESSES, AVAILABILITY, RELIABILITY, COMPUTATIONS

IDENTIFIERS: (U) WUAF05R230304A5, FEB1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 002 8/16 8/19

BETH ISRAEL HOSPITAL BOSTON MASS

(U) Fracture and Viscoelastic Characteristics of the Human Cervical Spine.

8 221P

PERSONAL AUTHORS: Edwards, W. T.; Hayes, W. C.; Kou, Y. F.; Coffee, W. S.; White, A. A., III;

CONTRACT NO. F49620-81-K-0010

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-88-0453

UNCLASSIFIED REPORT

ABSTRACT (U) Cervical spine segments were tested both nondestructively and destructively to determine the load-displacement relationships and vertebral strength. For this study, a servo-hydraulic multi-degree of freedom material testing machine was designed and constructed. This test system, called the Planar Testing Apparatus (PTA), was used to generate motions needed to characterize the sagittal response of spine segments. A study of the viscoelastic properties of two vertebrae lumbar spine segments was conducted following the completion of the PTA to check and demonstrate the test system. The results from a lumbar spine segment were also included in this report. The cervical spine segments consisted of three vertebrae and their interconnecting soft tissue, discs, and ligaments. A noninvasive electro-mechanical displacement monitoring apparatus was constructed to monitor the six degree of freedom motion of the middle vertebral body as it moved relative to the two adjacent vertebrae during the mechanical tests. Results for cervical spine specimens indicated that a low displacement rates (less than 5 mm/sec or 5 deg/sec) there was no dependence of spinal segment stiffness on displacement rate. Curves for load vs. displacement (both axial and shear) and moment vs. sagittal bending displayed large regions of small load and low slope as displacement increased. All specimens were stiffer in compression than in tension. All specimens displayed soft

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tissue failure before lumbar fracture for loading in flexion.

DESCRIPTORS: (U) *SPINAL COLUMN, *BONE FRACTURES, *VISCOELASTICITY, BIODYNAMICS, MOTION, SEGMENTED, NONDESTRUCTIVE TESTING, DESTRUCTIVE TESTS, LOAD DISTRIBUTION, DISPLACEMENT, STRENGTH(MECHANICS), TEST METHODS, FAILURE, CREEP, STIFFNESS, BENDING, TRANSDUCERS

IDENTIFIERS: (U) Vertebrae, WJAFOSR2312A2, PE81102F

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 001 11/2 20/11

SOUTHWEST RESEARCH INST SAN ANTONIO TEX DEPT OF MATERIALS SCIENCES

(U) Study of High Temperature Failure Mechanisms in Ceramics.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 85-31 Mar 86.

APR 86 2:5P

PERSONAL AUTHORITY: Page, Richard A.; Lankford, James;

REPORT NO. SRI-8578/2

CONTRACT NO. F49620-85-C-0073

PROJECT NO. 10

TASK NO. A2

MONITOR: AFTR TR 0485

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results of a fundamental study involving experimental characterization and analytical modeling of grain boundary cavitation and creep crack growth in structural ceramics exposed to pure tensile loading. The major experimental techniques employed in the program are the use of small-angle neutron scattering to characterize cavity nucleation and growth and stereographic analysis to characterize the stress and strain fields associated with growing creep cracks. In the first section of the report, the experimental progress is summarized. The design of the pure tensile creep apparatus, which is being used for the creation of bulk damage and for creep crack growth, is discussed. The progress made in the determination of surface precipitation conditions that are adequate for the stereographic analysis is also discussed. The second section of the report describes the results of a critical review of recent experimental and theoretical studies of creep cavitation in ceramics. The results of this critical study have identified a number of stochastic aspects of cavitation. The stochastic nature of cavitation arises primarily due to the dependence of both cavity nucleation and cavity growth on grain boundary

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sliding. A degree of randomness is also posed by the nonuniform distribution of nucleation sites. These results suggest that the measurement of grain boundary sliding rates and the development of a statistical model of cavitation will be crucial to the understanding and modeling of tensile creep failure.

DESCRIPTORS: (U) *CERAMIC MATERIALS, *FAILURE (MECHANICS), GRAIN BOUNDARIES, CAVITATION, CREEP, CRACK PROPAGATION, TENSILE STRESS, LOADS (FORCES), NUCLEATION, STRAIN (MECHANICS), DAMAGE ASSESSMENT, NEUTRON SCATTERING, STEREOPHOTOGRAPHY, STOCHASTIC PROCESSES, SLIDING, MATHEMATICAL MODELS, HIGH TEMPERATURE

IDENTIFIERS: (U) PE81102F, WUAF0SR2308A2

UNCLASSIFIED

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 997 9/2

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) TRAC (Texas Reconfigurable Array Computer): An Environment for Parallel Computing.

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 85.

84 8P

PERSONAL AUTHORS: Browne, J. G. ;

CONTRACT NO. F496 14-C-0020

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR 86-0480

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE, p294-298 1984.

ABSTRACT: (U) This paper defines one set of requirements for a successful general purpose parallel architecture, describes the design concepts of the Texas Reconfigurable Array Computer (TRAC) and then demonstrates that the TRAC architecture fulfills these requirements. It will be seen that TRAC implements a general purpose parallel computer system through its ability to implement a spectrum of single purpose architectures. Special attention is paid to architectural support for software and to the I/O problems for a many-processor architecture. (Author)

DESCRIPTORS: (U) *COMPUTER ARCHITECTURE, *PARALLEL PROCESSING, COMPUTATIONS, REQUIREMENTS, INPUT OUTPUT PROCESSING, REPRINTS

IDENTIFIERS: (U) TRAC(Texas Reconfigurable Array Computer), PE81102F, WUAFOSR2304A3

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STANFORD UNIV CA DEPT OF MATHEMATICS

(U) Classroom Notes in Applied Mathematics,

84 8P

PERSONAL AUTHORS: Verman, Ghast R. ; Keller, Joseph B. ;

CONTRACT NO. AFOSR-85-0007

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-86-0470

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Seminar on Nonlinear Partial Differential Equations, p89-113 1984.

ABSTRACT: (U) Free boundary problems are defined and illustrated by several problems in mechanics. First the problem of finding the free surface of a liquid in hydrostatic equilibrium is considered. Then the effect of surface tension is taken into account. Finally the contact of an inflated membrane, such as a balloon or tire, with a solid surface is formulated. This problem is solved by the method of matched asymptotic expansions when the contact area is small. (Author)

DESCRIPTORS: (U) *BOUNDARY VALUE PROBLEMS, *APPLIED MATHEMATICS, LIQUIDS, HYDROSTATICS, EQUILIBRIUM(GENERAL), INTERFACIAL TENSION, REPRINTS

IDENTIFIERS: (U) Free surface, PE81102F, WUAFOSR2304A4

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A188 895 12/1

AD-A189 995 12/1

RENSELAL POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

CALIFORNIA UNIV SANTA BARBARA ALGEBRA INST

(U) Scam: Control of a Vibrating String.

(U) Mixed Multiplicativity and 1 sub p Norms for Matrices.

86 22P

JAN 86 11P

PERSONAL AUTH: RS; McLaughlin, J. R.; Slemrod, M.;

PERSONAL AUTHORS: Goldberg, Moshe ;

CONTRACT NO. N00014-84-K-0818, AFOSR-81-0172

CONTRACT NO. AFOSR-83-0150

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A1

TASK NO. A3

MONITOR: A12R
IN 86-0387

MONITOR: AFOSR
TR-88-0472

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Mathematics and Optimization, V14 p27-47 1988.

SUPPLEMENTARY NOTE: Pub. in Linear Algebra and Its Applications, V7: 123-131 Jan 85.

ABSTRACT: (U) The purpose of this paper is to construct a stabilizing feedback control law for a vibrating string equation. The rest of this paper is divided into four sections. Section 1 reviews the necessary results needed on nonlinear algebraic groups and Section 2 provides the basic theory of asymptotic decay. Section 3 applies this theory to (F). Finally in Section 4 it is shown that the results are sharp. Giving an example in which (F) fails to yield asymptotic decay of $(y, y \text{ sub } t)$ for a smooth phi with compact support.

ABSTRACT: (U) Let $C \text{ sub } m \times n$ denote the class of $m \times n$ complex matrices; and let $N \text{ sub } 1, N \text{ sub } 2, \text{ and } N \text{ sub } 3$ be arbitrary norms on $C \text{ sub } m \times n, C \text{ sub } m \times k, \text{ and } C \text{ sub } k \times n, \text{ respectively. In this paper we discuss a best (least) positive constant micro sub min.}$

DESCRIPTORS: (U) *FEEDBACK, *CONTROL SYSTEMS, BOUNDARY VALUE PROBLEMS, NONLINEAR ALGEBRAIC EQUATIONS, POLYNOMIALS, REPRINTS

DESCRIPTORS: (U) *MATRICES(MATHEMATICS), CONSTANTS, LINEAR ALGEBRA, REPRINTS

IDENTIFIERS: (U) *Vibrating string equation, PEG1102F, WUAFOSR2304

IDENTIFIERS: (U) Multiplicativity, PEG1102F, WUAFOSR2304A3

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AD-A189 995

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A169 992 9/1

AD-A169 991 9/2

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) Picosecond Nonlinear Resonant Interactions in Semiconductor Structures.

(U) Framework for Formulation and Analysis of Parallel Computation Structures.

DESCRIPTIVE NOTE: Final rept. 1 Jan 82-30 Sep 85.

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 85.

MAR 86 80P

85 7P

PERSONAL AUTHORS: Nurmiikko, Anto V. ;

PERSONAL AUTHORS: Browne, J. C. ;

CONTRACT NO. F4J820-82-C-0044

CONTRACT NO. F49820-84-C-0020, NSF-MCS81-18099

PROJECT NO. 2308

PROJECT NO. 2304

TASK NO. 12

TASK NO. A3

MONITOR: AFOSR

MONITOR: AFOSR
TR-88-0459

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis is placed on the interaction of such materials with ultra short pulses of laser radiation in order to study carrier electronic and magnetic excitations under selected nonequilibrium conditions. We hoped to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g. we measured the formation of local, microscopic, magnetically oriented 'domains' through real-time spectroscopy with picosecond laser pulses (Author)

DESCRIPTORS: (U) SEMICONDUCTORS, OPTICAL PROPERTIES, MAGNETIC MATERIALS, SPECTROSCOPY, EXCITATION, EUROPIUM, CADMIUM, MANGANESE, SELENIUM, TELLURIUM

IDENTIFIERS: (U) Mixed crystal semiconductors, PEB1102F, WUAFOSR2 002

AD-A169 992

AD-A169 991

UNCLASSIFIED

SUPPLEMENTARY NOTE: Pub. in Proceedings of the Annual Hawaii International Conference on System Sciences (18th), p2-7 1985.

ABSTRACT: (U) This paper gives a systematic methodology for the formulation of parallel computation structures and algorithms. The methodology supports both synthesis of parallel algorithms and analysis of parallel algorithms. (Author)

DESCRIPTORS: (U) COMPUTER ARCHITECTURE, PARALLEL PROCESSING, ALGORITHMS, COMPUTATIONS, REPRINTS

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A3

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A189 990 9/2

AD-A189 989 12/1

NORTH CAROLINA STATE UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

(U) A Bilinearly Deterministic RHO-Mixing Stationary Random Process.

(U) Difference Methods for the Numerical Solution of Time-Varying Singular Systems of Differential Equations.

MAR 86 10P

APR 86 13P

PERSONAL AUTHOR: Bradley, Richard C.

PERSONAL AUTHORS: Clark, Kenneth D.

CONTRACT NO. F49620-85-C-0144, NSF-DMS84-01021

CONTRACT NO. AFOSR-84-0240, NSF-DMS83-18028

PROJECT NO. 1024

PROJECT NO. 2304

TASK NO. A5

TASK NO. A5

MONITOR: A1 3 TR J-0361

MONITOR: AFOSR TR-88-0445

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Transactions of the American Mathematical Society, v294 n1 p233-241 Mar 88.

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. on Algebraic and Discrete Methods, v7 n2 p236-246 Apr 88.

ABSTRACT: (U) A (nondegenerate) strictly stationary sequence $(X_{n,k}, k \text{ epsilon } Z)$ of random variables is constructed such that the rho-mixing (maximal correlation mixing) condition is satisfied and each $X_{n,k}$ is measurable with respect to the double tail delta-field. (Author)

ABSTRACT: (U) This reprint introduces a class of difference methods for the numerical solution of differential equations of the form $A(t)x' + B(t)x(t) = f(t)$ where $A, B,$ and f are assumed sufficiently smooth in t in the interval $I = (0, T)$ and $A(t)$ is identically singular on I . These methods are straightforward extensions of the well-known Gear's backward difference methods (BDF's) and correspond to BDF's whenever A is constant. It is shown that the modified methods (MBDF's) work whenever the system can be transformed to a constant coefficient problem by a change of variable $x = Ly$, and also whenever a related system can be transformed into a certain canonical form. The author also investigates the relationship between the convergence of BDF's and the continuous regularization of the system by its pencil perturbation. In particular, he shows the existence of examples where the BCF's converge but the pencil perturbation is not a continuous regularization. (Author)

DESCRIPTORS: (U) *SEQUENTIAL ANALYSIS, *RANDOM VARIABLES, CORRELATION STATIONARY, REPRINTS

DESCRIPTORS: (U) DIFFERENTIAL EQUATIONS, SOLUTIONS(GENERAL), NUMERICAL METHODS AND PROCEDURES, PERTURBATIONS, REPRINTS

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A5

IDENTIFIERS: (U) *Difference methods, PE81102F, WUAFOSR2304A5

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AD-A189 989

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A169 987 9/3

AD-A169 988 20/2 7/3

TEXAS A M UNIV COLLEGE STATION

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) An Analysis of a Nonparametric Detection Scheme for
Mixing Noise.

(U) 8,8,8-Trinitropentacyclo[5.3.0.0.2,6.0.3,8.0.4,8]decane,
C10H6N3O8

JUL 85 7P

85 4P

PERSONAL AUTHOR: RS: Halverson, Don R.; Wise, Gary L.;

PERSONAL AUTHORS: Ammon, Herman L.; Zhang, Dechun; Choi, C.
S.; Sandus, S.; Marchand, A. P.;

CONTRACT NO. N00014-81-K-0148. AFOSR-82-0333

CONTRACT NO. AFOSR-84-0085

PROJECT NO. 2304

PROJECT NO. 2303

TASK NO. 85

TASK NO. 82

MONITOR: SR
88-0434MONITOR: AFOSR
TR-88-0370

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Information Theory, VIT-31 n4 p522-527 Jul 85.

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, VC41
p404-408 1985.

ABSTRACT: It is shown how a modified sign detector
may be used for the nonparametric detection of a
constant signal in strong mixing noise. An upper bound on
the asymptotic performance of the detector is established,
and the performance of a detector whose performance achieves
this bound is specified. The optimal design of the
detector is also specified. A finite sample criterion is also
considered, and it is shown that there is a marked
difference in the detector designs resulting from the two
criteria. Keywords: Nonparametric detection;
Strong mixing noise; Modified sign detector; Reprints.

ABSTRACT: (U) There is considerable interest in the
synthesis and chemistry of strained energetic compounds.
Polynitropolycyclic compounds are potential members of
this important class. In this paper, we report the
structure of the first polynitrobishomocubane (I) to have
been prepared. The structure of one other homocubane
(homocubane-carboxylic acid p-bromoanilide has been
reported.

DESCRIPTORS: (U) NOISE REDUCTION; SIGNAL PROCESSING;
(U) MIXERS (ELECTRONICS); CONSTANTS; MIXING; NOISE;
OPTIMIZATION; REPRINTS; SIGNALS; ASYMPTOTIC SERIES

DESCRIPTORS: (U) DECANES; NITRO RADICALS; POLYCYCLIC
COMPOUNDS; CRYSTAL STRUCTURE; SYNTHESIS (CHEMISTRY);
MOLECULAR STRUCTURE; ENERGETIC PROPERTIES; X RAY
DIFFRACTION

IDENTIFIERS: (U) Nonparametric detection

IDENTIFIERS: (U) Cubanes; Cubane/Polynitrobishomo-
PF61102F; WJAF05R23082

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 981 9/2

AD-A169 981 CONTINUED

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

Computer), CSL programming language, CSL (Computation Structures Language), PEB102F, WJAFOSR2304A3

(U) High Performance Parallel Computing

DESCRIPTIVE NAME Final rept. 1 Feb 44-31 Jan 81,

JAN 86 23P

PERSONAL AUTHOR S. Browne, J. G. Lipovski, G. J. ;

CONTRACT NO. F49820-84-C-0020

PROJECT NO. 304

TASK NO. A3

MONITOR: AF 2 TR 5 0457

UNCLASSIFIED REPORT

ABSTRACT: (U) The 1984/85 accomplishments of the research project High Performance Parallel Computing included bringing the prototype of the Texas Reconfigurable Array Computer (TRAC) to a configuration and to a state of stability where it could support execution of simple assembly language programs. Initial development of a unified model of parallel computation which is a basis for a programming environment uniting process and data flow models of parallel computation, bringing to a national status on an alternative host one of the two parallel programming languages (the Computer Structures Language, CSL) originally intended for use on the exploration of the expressive capabilities of this programming language, initiation of development of a graphical programming language based on the unified model of parallel computation mentioned preceding, progress on a graphically interfaced Petri net performance modeling system for parallel computation, and development of algorithms for scheduling of circuits to realize configurations in configurable banyan network based computer architectures

DESCRIPTORS: (U) PARALLEL PROCESSING, COMPUTATIONS, ASSEMBLY LANGUAGE, CONFIGURATIONS, PROTOTYPES, FORTRAN, ALGORITHMS, SCHEDULING

IDENTIFIERS: (U) TRAC(Texas Reconfigurable Array

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M
AD-A189 980 CONTINUED

AD-A189 980 11/8 20/11

CALIFORNIA UNIV BERKELEY DEPT OF MATERIALS SCIENCE AND
MINERAL ENGINEERING

(U) Fatigue Behavior of Long and Short Cracks in Wrought
and Cast Aluminum Alloys.

DESCRIPTIVE NOTE: Annual rept. 15 Apr 85-1 May 86,

MAY 86 127P

PERSONAL AUTHORS: Ritchie, Robert O.; Yu, Weikang;

REPORT NO UCB/RP/86/A1040

CONTRACT NO AFOSR-82-0181

PROJECT NO 2308

TASK NO. A1

MONITOR: AFOSR
IR-86-0447

UNCLASSIFIED REPORT

ABSTRACT: (U) The fatigue behavior of short cracks, which are small compared to the scale of the microstructure, small compared to the scale of local plasticity or simply physically small (i.e., $a < 1$ mm), must be considered as one of the major factors limiting the application of defect-tolerant fatigue design for airplane and engine components. Accordingly, the current program is aimed at identifying factors which govern the growth of such short cracks (in contrast to long cracks) in a series of commercial aluminum alloys, with specific reference to behavior at near-threshold levels (below approximately 10,000 cycles). In this annual report, the status of the program is described in terms of: i) a description of results on the role of compression overloads in influencing fatigue crack growth in a new aluminum-lithium alloy (2080) and a comparison of behavior with results in 2124 and 7150, ii) an evaluation of the role of crack tip shielding in controlling the growth of short (50 to 400 micrometers) through-thickness cracks and small (10 to 400 micrometers) surface cracks in 2124 and iii) a general assessment of the small crack problem. It is concluded that the near-threshold behavior of long cracks and the near- and sub threshold behavior

of small cracks is strongly influenced by considerations of crack tip shielding, specifically from crack deflection and crack closure mechanisms. Other factors responsible for anomalous small crack behavior, however, can be identified and are discussed in the report.

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *FATIGUE (MECHANICS), *CRACKS, DEFECTS (MATERIALS), TOLERANCES (MECHANICS), AMPLITUDE, LOADS (FORCES), CRACK PROPAGATION, COMPRESSIVE PROPERTIES, LITHIUM ALLOYS, THRESHOLD EFFECTS, SHIELDING, DEFLECTION, MICROSTRUCTURE, GRAIN STRUCTURES (METALLURGY), INITIATION, RESISTANCE, FATIGUE LIFE

IDENTIFIERS: (U) Crack closure, Crack inhibition, Aluminum-lithium alloys, WUAFOSR2308A1, PER 2F

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SEARCH CONTROL NO. EVN34M

AD-A169 972

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12/1

ILLINOIS UNIV CHAMPAIGN COGNITIVE PSYCHOPHYSIOLOGY LAB

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) The Event Related Brain Potential as an Index of Information Processing and Cognitive Activity. A Program of Basic Research. Supplement A. Neuroanagetic Studies.

(U) Extremal Processes, Record Times and Strong Approximation.

DESCRIPTIVE NOTE: Annual progress rept. 20 Apr 84-31 Dec 85.

DESCRIPTIVE NOTE: Technical rept..

DEC 85

15P

MAR 86

23P

PERSONAL AUTHORS: Pfeifer, Dietmar ;

PERSONAL AUTHORS: Kaufman, Lloyd ; Donchin, Emanuel ;

REPORT NO. TR-131

REPORT NO. CPL-86-1A

CONTRACT NO. F49620-85-C-0144

CONTRACT NO. F49620-85-C-0041

PROJECT NO. 2313

PROJECT NO. 2304

TASK NO. AA

TASK NO. AB

MONITOR: AFOSR

MONITOR: AFOSR

TR-86-04B1

TR-86-0340

UNCLASSIFIED REPORT

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ABSTRACT: (U) A study was conducted to evaluate the feasibility of obtaining concurrent measures of event-related potentials (ERPs), and event-related magnetic fields (ERFs). Subjects participated in an oddball task while simultaneous ERPs and ERFs were recorded. Isocontour field maps generated for the P300 component are consistent with the suggestion that the P300 may be generated in, or near, the hippocampal formation.

DESCRIPTORS: (U) *MAGNETOENCEPHALOGRAMS, *ELECTROENCEPHALOGRAPHY, *ELECTROPHYSIOLOGY, *INFORMATION PROCESSING, *COGNITION, BRAIN, MAGNETIC FIELDS, HIPPOCAMPUS, VISION, STIMULI, COUNTING METHODS, DIPOLES, DISCRIMINATION, NOISE, REACTION TIME

IDENTIFIERS: (U) *event related potentials, PE61102F, WUAFOSR2313A4

DESCRIPTORS: (U) *APPROXIMATION(MATHEMATICS), DISTRIBUTION FUNCTIONS, RANDOM VARIABLES, INTERPOLATION, PROBABILITY

IDENTIFIERS: (U) WUAFOSR2304AB, PE61102F

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AD-A188 971 11/2 13/8

AD-A188 971 CONTINUED

BATTELLE COLUMBUS DIV OH

IDENTIFIERS: (U) PEG1102F, WJAFOSR2308A2

(U) Hot Isostatic Pressing of Ceramic Powder Compacts.

DESCRIPTIVE NOTE: Final rept. 1 Jun 84-31 Dec 85.

JAN 86 174P

PERSONAL AUTHORS: McCoy, J. K.; Markworth, A. J. ;

CONTRACT NO. AFOSR-82-0238

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-88-0348

UNCLASSIFIED REPORT

ABSTRACT: (U) The densification of aluminum oxide in hot isostatic pressing has been studied in detail. Methods for calculating maps of densification rate as function of temperature and applied pressure have been developed. A new mechanism, interface-reaction-controlled grain-boundary diffusion, has been found which describes the densification of high-purity, fine-grained (grain radius up to 1423 K. Theoretical models have been developed for this mechanism for both the initial and final stages of densification. Standard geometries have been used for the models; the initial stage is described in terms of impinging spherical particles, and the final stage is described in terms of isolated pores. The theoretical model is found to describe the data for fractional densities up to at least 0.9, although it breaks down for higher densities. From theoretical studies of final stage, we find indications that the discrepancy between theory and experiment is due at least in part to neglect of the effects of a distribution of pore sizes.

DESCRIPTORS: (U) *CERAMIC MATERIALS, *POWDERS, *ISOSTATIC PRESSING, *HOT PRESSING, ALUMINUM OXIDES, COMPACTING, TEMPERATURE, PRESSURE, GRAIN BOUNDARIES, SOLUTIONS, DIFFUSION, FINE GRAINED MATERIALS, DENSITY, RATES, MAPS, MODEL THEORY

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SEARCH CONTROL NO. EVN34M

AD-A188 970 12/1

AD-A189 988 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) A Negative Result About Some Concepts of Negative Dependence.

(U) A Structure Theorem on Bivariate Positive Quadrant Dependent Distributions and Tests for Independence in Two-Way Contingency Tables.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Technical rept..

JUL 88 9P

DEC 85 62P

PERSONAL AUTHORS: Jog-Dev, Kumar; Proschan, Frank;

PERSONAL AUTHORS: Rao, M. B.; Krishnamah, P. R.; Subramanyam, K.;

CONTRACT NO. F48620-88-C-0007

PROJECT NO. 2304

REPORT NO. TR-85-48

TASK NO. A5

CONTRACT NO. F48620-85-C-0008

MONITOR: AFOSR

PROJECT NO. 2304

TR 88-0454

TASK NO. A5

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-88-0344

ABSTRACT: (U) It seems that either a very strong negative dependence holds with the monotonicity condition while without it, even a somewhat weak condition does not hold. This brings out the crucial role played by the PF2 (log concave density) property in conditional negative dependence.

DESCRIPTORS: (U) *RANDOM VARIABLES, *DISTRIBUTION, PROBABILITY, REAL NUMBERS

IDENTIFIERS: (U) *Negative dependence, Conditional distribution, WUAFOSR2304A5, PE81102F

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the set of all bivariate positive quadrant dependent distributions with fixed marginals is shown to be compact and convex. Extreme points of this convex set are enumerated in some specific examples. Applications are given in testing the hypothesis of independence against strict positive quadrant dependence in the context of ordinal contingency tables. Various procedures based upon certain functions of the eigenvalues of a random matrix are also proposed for testing for independence in two-way contingency table. The performance of some tests one of which is based on eigenvalues of a random matrix is compared.

DESCRIPTORS: (U) *BIVARIATE ANALYSIS, THEOREMS, DISTRIBUTION FUNCTIONS, EIGENVALUES, HYPOTHESES, ASYMPTOTIC SERIES, RANDOM VARIABLES

IDENTIFIERS: (U) Positive quadrant dependent distributions, Asymptotic distributions, Compact sets, Convex sets, Contingency tables, Power functions, Hypothesis of independence, WUAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 984 20/13 20/3

AD-A169 984 CONTINUED

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH
PA(U) High Specific Heat Dielectrics and Kapitza Resistance
at Dielectric Boundaries.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 83-30 Sep 85.

SEP 85 417P

PERSONAL AUTHORS: Echels, P. W.; Lavless, W. N.; Parker, J.
H., Jr.; Patton, B. R.; Clark, C. F.

CONTRACT NO F49620-83-C-0128

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-88-0477

UNCLASSIFIED REPORT

ABSTRACT: (U) This program has two efforts: Kapitza and thermal properties studies. Two separate Kapitza conductance test facilities have been designed and fabricated for both solid solid and for solid liquid HE measurements. Preliminary data has been obtained for λ for λ to λ C λ interface conductance and for the latter two materials, the test dewars were designed to allow cleaving of the samples under liquid helium. The Kapitza conductance of both samples was very near the photon radiation limit providing strong evidence that the anomalous Kapitza conductance is not the result of surface contamination. Thermal properties work has included the measurement of the specific heat and thermal conductivity of the CdCr204 spinels and of several CSc λ structure heavy metal halides in the temperature range of 1.5 to 35K. The specific heat data for the spinels was analyzed in terms of both lattice phonons and magnetic contributions. The dependence of the spinel's thermal conductivity on magnetic fields up to 15T was studied and magnetocaloric data has been obtained. For both the Zn and Cd spinels, the latter results showed a paramagnetic behavior with demagnetization cooling and magnetization heating. Theory has been developed to

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explain some of the magnetocaloric effects in the new spinels, CdCr204 and ZnCr204.

DESCRIPTORS: (U) *LIQUID HELIUM, *THERMAL CONDUCTIVITY, *THERMAL RESISTANCE, BEHAVIOR, BOUNDARIES, CONDUCTIVITY, COOLING, COPPER, DEMAGNETIZATION, DEWAR FLASKS, DIELECTRICS, HEATING, HIGH TEMPERATURE, LIMITATIONS, MAGNETIC FIELDS, MAGNETIZATION, PARAMAGNETISM, PHONONS, RADIATION, RANGE(EXTREMES), SPECIFIC HEAT, SPINEL, TEMPERATURE, TEST FACILITIES, THERMAL PROPERTIES, POTASSIUM COMPOUNDS, BROMIDES, LITHIUM FLUORIDES, ZINC COMPOUNDS, CADMIUM COMPOUNDS

IDENTIFIERS: (U) *Kapitza resistance, Helium 2,
MUAFO5R2301A7, PEB102F

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A100 903 8/11 18/3

WICKAY SCHOOL OF MINES RENO NV SEISMOLOGICAL LAB

(U) Attenuation in the Western Great Basin.

DESCRIPTIVE NOTE: Final rept. 1 Oct 84-30 Jun 85.

FEB 86 122P

PERSONAL AUTHORS: Priestley, Keith ;

CONTRACT NO. F48020-83-C-0012, ARPA Order-4387

MONITOR: AFOSR
TR 88-0378

AD-A100 903 CONTINUED

ATTENUATION, ANOMALIES, SEISMIC DATA, DELAY, NUCLEAR
EXPLOSION TESTING, YIELD(NUCLEAR EXPLOSIONS), ESTIMATES,
SPECTRA, SOURCES, NUCLEAR EXPLOSION DETECTION,
EARTHQUAKES, BASINS(GEOGRAPHIC), NEVADA, CALIFORNIA,
REPRINTS

IDENTIFIERS: (U) Great Basin Province, Seismic velocity,
Calderas, Upper mantle, Seismic magnitude, Nevada Test
Site, PEG1101F

UNCLASSIFIED REPORT

ABSTRACT: (U) In comparing teleseismic P wave delays in the vicinity of the Central Nevada Test Site in Hot Creek Valley, NV, with P-delay data over a wider region in the Great Basin we found that upper mantle speeds under Hot Creek Valley stations are higher than the average for the Great Basin as a whole, but lower than those beneath Pahute Mesa. These observations indicate that the caldera complex in Hot Creek Valley may have a high speed root similar to that proposed to exist beneath the Silent Canyon caldera at Pahute Mesa. In contrast, the Hot Creek Valley anomaly is not as strong as the Pahute mesa anomaly. The shadow zone caused by the Pahute Mesa structure is much more pronounced and consequently magnitudes of Pahute mesa explosions can be underestimated relative to the magnitude of Hot Creek Valley explosions of similar yield. Spectral amplitudes for 24 events of the Mammoth Lakes earthquakes sequence have been determined for the frequency range 0.1-10.0 Hz, including the M sub L 8 earthquake at 1450 UT on May 27, 1980. We have found nothing in the spectra of this event nor in the spectra of the aftershocks to distinguish them from spectra of 'tectonic' earthquakes. However, the spectra themselves do not distinguish between various possible explanations for the non-double-couple source mechanism observed in moment tensor inversion and first motion data for the largest events of the Mammoth Lakes earthquake sequence. Journal reprints are included as appendices.

DESCRIPTORS: (U) *PRIMARY WAVES(SEISMIC WAVES),
*STRUCTURAL GEOLOGY, *EARTH CRUST, EARTH MANTLE, VELOCITY.

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AD-A169 960 20/5

AD-A169 959 12/2

ILLINOIS UNIV AT URBANA CHARGED PARTICLE RESEARCH LAB

NORTH CAROLINA UNIV AT CHAPEL HILL CURRICULUM IN
OPERATIONS RESEARCH AND SYSTEMS ANALYSIS(U) Optical Pumping of High Power Lasers with an Array of
Plasma Pinches(U) Maximum Flow and Critical Outset as Descriptors of
Multi-State Systems with Randomly Capacitated
Components.

DESCRIPTIVE NOTE: Final rept. 1 Nov 81-31 Oct 84.

APR 86 31P

DESCRIPTIVE NOTE: Technical rept.,

PERSONAL AUTHORS: Kim, Kyekyoon K. ;

MAR 86 35P

CONTRACT NO. AFOSR-82-0017

PERSONAL AUTHORS: Fishman, George S. ;

PROJECT NO. 2301

REPORT NO. UNC/ORSR/TR-86-1

TASK NO. A8

CONTRACT NO. AFOSR-84-0140

MONITOR: AFOSR

PROJECT NO. 2304

TR-86-0478

TASK NO. A5

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-86-0385

ABSTRACT: (U) Two dense plasma focus systems, the hypocyloidal pinch and the Mather type were investigated as the potential excitation light sources for high energy, short wavelength lasers. Using the hypocyloidal pinch (HCP), extensive lasing experiments were successfully performed. For the first time, on organic dyes producing results indicative of the capabilities and limitations the HCP system as an optical pump. A proof of principle lasing experiment was also performed for the first time using the Mather type dense plasma focus (MDPF) successfully. Results thus far indicate that both HCP and MDPF are excellent high energy, short wavelength optical pumps and that as an optical pump, the MDPF system is more versatile, efficient, and powerful than the HCP system, especially in the short wavelength spectral region.

DESCRIPTORS: (U) *OPTICAL PUMPING, *PINCH EFFECT, *DYE LASERS, DENSITY, DYES, EXCITATION, FOCUSING, HIGH ENERGY, HIGH POWER, LIGHT SOURCES, ORGANIC COMPOUNDS, PLASMAS(PH-SICS), SHORT WAVELENGTHS

IDENTIFIERS: (U) *Blue green lasers, HCP(hypocyloidal Pinch), MDPF(Mather-type Dense Plasma Focus), Laser dye 480, Rhodamine 86 dye, Coumarin 480 dye, Coumarin 504 dye, PE61102F, WUAFOSR2301A8

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UNCLASSIFIED REPORT

ABSTRACT: (U) Let $G = (V, E, s, t)$ denote a directed network with node set V , arc set $E = \{1, \dots, n\}$, source node s and sink node t . Let $g_{\alpha\alpha\alpha}$ denote the set of all minimal s - t cutsets and $B_1(\tau), \dots, B_n(\tau)$, the random arc capacities at time τ with known joint probability distribution function. Let $\lambda(\tau)$ denote the maximum s - t flow at time τ and $D(\tau)$, the corresponding critical minimal s - t cutset. Let ω denote a set of minimal s - t cutsets. This paper describes a comprehensive Monte Carlo sampling plan for efficiently estimating the probability that $D(\tau)$ epsilon ω subset of ω and $x < \lambda(\tau) < \omega = y$ at time τ and the probability that $D(\tau)$ epsilon ω given that $x < \lambda(\tau) < \omega = y$ at time τ . The proposed method makes use of a readily obtainable upper bound on the probability that $\lambda(\tau) > x$ to gain its computational advantage. Techniques are described for computing confidence intervals and credibility measures for assessing that specified accuracies have been achieved. The paper includes an algorithm for performing the Monte Carlo sampling experiment, an example to illustrate the technique and a listing of all steps

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 858 CONTINUED

AD-A169 958 12/1

needed for implementation. (Author)

DESCRIPTORS: (U) *NETWORK FLOWS, *MONTE CARLO METHOD, *SAMPLING, ALGORITHMS, ESTIMATES, RELIABILITY, PROBABILITY DISTRIBUTION FUNCTIONS, NODES, COMPUTATIONS, CONFIDENCE LIMITS

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Nonparametric Sequential Estimation of Zeros and Extrema of Regression Functions.

DESCRIPTIVE NOTE: Technical rept.,

IDENTIFIERS: (U) PEB1102F, WJAFOSR2304A5

JAN 86 18P

PERSONAL AUTHORS: Haerdle, Wolfgang ;

REPORT NO. TR-133

CONTRACT NO. F49820-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-85-0400

UNCLASSIFIED REPORT

ABSTRACT: (U) Let (X, Y) , $(X$ sub 1, Y sub 1), $(X$ sub 2, Y sub 2), ... be independent, identically distributed, bivariate random variables and let $m(x) = E(Y/X=x)$ be the regression curve of Y on X . This paper considers the estimation of zeros and extrema of the regression curve via stochastic approximation methods. The author presents consistency results of some sequential procedures and define termination rules providing fixed width confidence intervals for the parameters to be estimated. Keywords: kernel regression; nonparametric regression. (Author)

DESCRIPTORS: (U) *ESTIMATES, *APPROXIMATION(MATHEMATICS), *NONPARAMETRIC STATISTICS, REGRESSION ANALYSIS, DISTRIBUTION CURVES, RANDOM VARIABLES, BIVARIATE ANALYSIS, SEQUENCES(MATHEMATICS), STOCHASTIC PROCESSES, KERNEL FUNCTIONS

IDENTIFIERS: (U) PEB1102F, WJAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 957 6/1 6/10

COLORADO STATE UNIV FORT COLLINS COLL OF VETERINARY
MEDICINE AND BIOMEDICAL SCIENCES(U) Characterization of the Sites Phosphorylated on
Tyrosine Hydroxylase by Ca^{2+} and Phospholipid-
Dependent Protein Kinase, Calmodulin-Dependent
Multi-protein Kinase and Cyclic AMP-Dependent Protein
Kinase

MAR 85 6P

PERSONAL AUTHORS: Vuille, P. R.; Woodgett, James R.;
Ferrari, Stefano; Hardie, D. G.;

CONTRACT NO. AFOSR-84-0122

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-88-0480

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in FEBS Letters, v192 n2 p335-
339 Mar 85.ABSTRACT: (U) This communication identifies the
phosphorylation sites on tyrosine hydroxylase, the rate
limiting enzyme in the biosynthesis of the catecholamine
neurotransmitters. The phosphorylation of the enzyme by
the calcium and phospholipid dependent protein kinase
(protein kinase C) is established and it is reported that
both protein kinase C and cyclic AMP dependent protein
kinase C and cyclic AMP dependent protein kinase
phosphorylate the identical site on the enzyme.DESCRIPTORS: (U) *OXIDOREDUCTASES, *PHOSPHORYLATION,
*CALCIUM, *PHOSPHORUS TRANSFERASES, TYROSINE, SITES,
CATIONS, *PHOSPHOLIPIDS, PROTEINS, ADENOSINE PHOSPHATES,
NEUROCHEMICAL TRANSMISSION, BIOSYNTHESIS, CATECHOLAMINES,
ACETYLCHOLINE, REPRINTSIDENTIFIERS (U) *Kinases, Calmodulin, AMP/Adenosine
Monophosphate, Cyclic AMP, PE81102F, WUAFOSR2312A1

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AD-A168 955

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AD-A168 955 12/1

PITTSBURGH UNIV PA INST FOR COMPUTATIONAL MATHEMATICS AND
APPLICATIONS(U) Estimation of the Error in the Reduced Basis Method
Solution of Nonlinear Equations,

OCT 85 11P

PERSONAL AUTHORS: Porsching, T. A.;

CONTRACT NO. AFOSR-80-0176

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-80-0473

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematics of Computation,
v48 n172 p487-498 Oct 85.ABSTRACT: (U) The reduced basis method is a projection
technique for approximating the solution curve of a
finite system of nonlinear algebraic equations by the
solution curve of a related system that is typically of
much lower dimension. In this paper, the reduced basis
error is shown to be dominated by an approximation error.
This, in turn, leads to error estimates for projection
onto specific subspaces; for example, subspaces related
to Taylor, Lagrange and discrete least-squares
approximation. (Author)DESCRIPTORS: (U) *PROJECTIVE TECHNIQUES, *ESTIMATES,
NONLINEAR ALGEBRAIC EQUATIONS, CURVATURE, ERRORS,
APPROXIMATION(MATHEMATICS), REPRINTSIDENTIFIERS: (U) *Reduced basis method, PE81102F,
WUAFOSR2304A3

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DTIC REPORT BIBLIOGRAPHY

AD-A169 953

12/1

PITTSBURGH UNIV PA DEPT OF MATHEMATICS AND STATISTICS
(U) Moving Average Models with Bivariate Exponential and Geometric Distributions.

DESCRIPTIVE NOTE: Technical rept..

MAR 88 22P

PERSONAL AUTHORS: Langberg,Naftali A.;Stoffer,David S.;

REPORT NO. TR-88-02

CONTRACT NO. AFOSR-84-0113

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0408

UNCLASSIFIED REPORT

ABSTRACT: (U) Two classes of finite and infinite moving average sequences of bivariate random vectors are considered. The first class has bivariate exponential marginals while the second class has bivariate geometric marginals. The theory of positive dependence is used to show that in various cases the two classes consist of associated random variables. Association is then applied to establish moment inequalities and to obtain approximations to some joint probabilities of the bivariate processes. (Author)

DESCRIPTORS: (U) *STATISTICAL DISTRIBUTIONS.
*SEQUENCES, MATHEMATICS). *MATHEMATICAL MODELS, BIVARIATE ANALYSIS, RANDOM VARIABLES, APPROXIMATION, MATHEMATICS, GEOMETRY, EXPONENTIAL FUNCTIONS

IDENTIFIERS: (U) *Moving average models. PEB1102F.
WUAFOSR22304A5

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AD-A169 950

SEARCH CONTROL NO. EVN34M

AD-A169 950 22/2 12/1

CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) A Mathematical Formulation of a Large Space Structure Control Problem.

DESCRIPTIVE NOTE: Interim rept..

SEP 85 8P

PERSONAL AUTHORS: Balakrishnan,A. V.;

CONTRACT NO. AFOSR-83-0318

PROJECT NO. 9789

TASK NO. 01

MONITOR: AFOSR
TR-88-0444

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper presents an abstract-mathematical formulation of a Large Space Structure Control problem. The physical apparatus consists of a softly supported antenna attached to the space shuttle by a flexible beam-like truss. The control objective is to slew the antenna on command within the given accuracy and maintaining stability. The control forces and torques are applied at the shuttle end as well as the antenna end and in addition provision is made for a small number of 2-axis proof-mass actuators along the beam. The beam motion is modelled by partial differential equations. Of the variety of Control problems possible we touch only on the time-optimal problem. (Author)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *SPACE SHUTTLES, *APPLIED MATHEMATICS, EQUATIONS OF MOTION, HILBERT SPACE, ANTENNAS, TRUSSES, DAMPING, PARTIAL DIFFERENTIAL EQUATIONS

IDENTIFIERS: (U) WUAFOSR978901, PEB1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 848 11/8 20/11

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS

(U) Finite Element and Experimental Studies of Creep Crack Initiation of RENE-88 Superalloy

DESCRIPTIVE NOTE: Final rept. 1 Sep 82-28 Feb 86.

FEB 86 82P

PERSONAL AUTHORS: Pian, Theodore H.; Sifra, Pedro J.; Lee, Michael J.

CONTRACT NO. AFOSR-82-0220

PROJECT NO. 2307

TASK NO. 82

MONITOR: AFOSR TR-88-0488

UNCLASSIFIED REPORT

ABSTRACT: (U) A study was made of crack initiation due to localized creep action for a nickel-base superalloy RENE 88. Crack initiation times of single-edge-notched specimens and circumferentially notched axisymmetric specimens were determined experimentally under constant loads and a given elevated temperature. Corresponding finite element analyses using assumed stress hybrid elements were made to determine the stress and strain histories up to the crack initiation times. Through the study of specimens with notches of different geometries at different loading levels a large range of stress and strain parameters were covered. It has been found that the only parameter that falls on a narrow band when plotted against the initiation time is the magnitude of maximum equivalent stress at the time of crack initiation.

DESCRIPTORS: (U) *NICKEL ALLOYS, *SUPERALLOYS, *CREEP, *CRACK (FRACTURING), *RUPTURE, CRACK PROPAGATION, NOTCH SENSITIVITY, LOADS (FORCES), HIGH TEMPERATURE, STRESSES, STRAIN (MECHANICS), FINITE ELEMENT ANALYSIS

IDENTIFIERS (U) Nickel alloy RENE 88, PEG1102F

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AD-A-99 841

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AD-A188 841 8/8 8/10

ESSEX CORP ORLANDO FL

(U) Eye Movements as an Index of Mental Workload.

DESCRIPTIVE NOTE: Final rept. 18 Jul 85-14 Mar 88 on Phase 1.

MAR 88 20P

PERSONAL AUTHORS: May, James G.; Kennedy, Robert S.; Williams, Mary C.; Dunlap, William P.; Brannan, Julie R.

CONTRACT NO. F48020-85-C-0121

PROJECT NO. 3008

TASK NO. A1

MONITOR: AFOSR TR-88-0418

UNCLASSIFIED REPORT

ABSTRACT: (U) Two investigations were carried out to assess the feasibility of using eye movement measures as nonintrusive indicators of mental workload. In the first experiment, measures of saccadic latency and eye movement velocity were obtained during alternating eye movement scans while subjects were differentially task loaded by simple, moderate, and complex auditory tone counting. The latency and eye movement velocity measures changed but did not differ reliably as tone counting complexity (workload) was increased. In the second experiment, the spatial extent of spontaneous saccades was measured under three levels of tone counting complexity. The results indicated that the extent of such eye movements varied inversely (p less than .018) as tone counting complexity increased. This index appears to hold promise for the development of an objective indicator of mental workload. (Author)

DESCRIPTORS: (U) *EYE MOVEMENTS, *MENTAL ABILITY, AUDIO TONES, COUNTING METHODS, HEARING, INDEXES, INDICATORS, INFRARED TRACKING, PERFORMANCE (HUMAN), SCANNING, VELOCITY, WORKLOAD

IDENTIFIERS: (U) WJAFOSR3008A1, PEG1102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A188 940 12/1

AD-A188 938 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) Ordering Distributions by Scaled Order Statistics.

(U) A Nonparametric Quantile Estimator: Computation.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Technical rept..

JUN 88 18P

MAY 88 21P

PERSONAL AUTHORS: Scarini, Marco ; Shaked, Moshe ;

PERSONAL AUTHORS: Padgett, W. U. ;

CONTRACT NO. AFOSR-84-0260

REPORT NO. TR-117, 82008-9

PROJECT NO. 2304

CONTRACT NO. AFOSR-84-0188, NIPR-ARC-138-88

TASK NO. A5

PROJECT NO. 2304

MONITOR: AFOSR

TASK NO. A5

TR-88-0384

MONITOR: AFOSR

TR-88-0380

UNCLASSIFIED REPORT

ABSTRACT: (U) Motivated by applications in reliability theory, we define a preordering of nonnegative random vectors by requiring a to be stochastically smaller than the kth order statistic of a sub 1 y sub 1, ..., a sub n y sub n for all choices of a sub 1 > 0, 1 = 1, 2, ..., n.

DESCRIPTORS: (U) *ORDER STATISTICS, DISTRIBUTION, STOCHASTIC PROCESSES, RELIABILITY, VECTOR ANALYSIS

IDENTIFIERS: (U) WJAFOSR2304A8, PEB1102F

UNCLASSIFIED REPORT

ABSTRACT: (U) Right-censored data arise very naturally in life testing and reliability studies. For such data, it is important to be able to obtain good nonparametric estimates of various characteristics of the unknown lifetime distribution. This report concerns the computational procedure for a kernel-type nonparametric estimator of the quantile function of the lifetime distribution from right-censored data. This estimator was suggested by Padgett (1988), extending the complete sample results of Yang (1988). The large sample properties of the estimator, such as asymptotic normality and mean square convergence, were studied by Lio, Padgett and Yu (1988) and by Lio and Padgett (1988). In this report, a procedure for calculation of the kernel-type quantile estimate from right-censored data is described, and a listing of a computer program in FORTRAN code is provided.

DESCRIPTORS: (U) *ESTIMATES, *NONPARAMETRIC STATISTICS, COMPUTATIONS, BANDWIDTH, COMPUTER PROGRAMS, FORTRAN, BIAS, CONFIDENCE LIMITS

IDENTIFIERS: (U) Quantile functions, Smoothing(Mathematics), Bootstrap method, WJAFOSR2304A8, PEB1102F

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SEARCH CONTROL NO. EVN34M

AD-A189 938 12/1

AD-A189 937 12/1

ARIZONA UNIV TUCSON

MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS

(U) Inequalities for Probability Contents of Convex Sets
via Geometric Average.

(U) Zero-Crossings Analysis.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Technical rept.,

NOV 88 18P

JAN 88 73P

PERSONAL AUTHORS: Shaked, Moshe; Tong, Y. L.

PERSONAL AUTHORS: Kedem, Benjamin;

CONTRACT NO. AFOSR-84-0206, NSF-MCS82-00098

CONTRACT NO. AFOSR-82-0187

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A5

TASK NO. A5

MONITOR: AFOSR
TR-88-0388MONITOR: AFOSR
TR-88-0413

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Georgia Inst. of Tech., Atlanta. Grants NSF-MCS81-00778 and NSF-DMS88-02346

ABSTRACT: (U) This paper derives such an inequality for a large class of density functions and a large class of convex sets. The most general results are given for the bivariate case. An extension to the n-dimensional case appears to be difficult except for some special cases such as the case of independent identically distributed random variables or when the underlying joint density is spherically symmetric. The class of convex sets considered includes D sub infinity and D sub 2 as special cases and special applications are given for elliptically contoured distributions and scale parameters families. In all these cases, universal upper bounds on the probability contents can be given by substituting the values of the a sub i's by their geometric mean.

ABSTRACT: (U) A coherent development of zero crossing based methods and theory appropriate for fast signal analysis are advanced. Quite a few ideas pertaining to zero crossing counts found in the literature can be expressed and interpreted with the help of this more general setup. A central issue addressed in some detail, is the fruitful connection which exists between zero crossing counts and linear filtering. This connection is explored and interpreted with the help of a certain zero crossing spectral representation, is then applied in spectral analysis, detection and discrimination. Zero crossing counts in filtered time series are called higher order crossings. The theme of the work is that higher order crossings analysis provides a useful descriptive as well as analytical tool that can in many respects match spectral analysis. To a great extent these two types of analysis are in fact equivalent, but each emphasizes a different point of view. Advantages offered by higher order crossings are great simplicity and a drastic data reduction.

DESCRIPTORS: (U) *INEQUALITIES, PROBABILITY, CONVEX SETS, DENSITY, BIVARIATE ANALYSIS, PERMUTATIONS, INVARIANCE, RANDOM VARIABLES

DESCRIPTORS: (U) *DETECTION, *TIME SERIES ANALYSIS, *SPECTRUM ANALYSIS, *CROSSINGS, COHERENCE, DATA REDUCTION, FILTERS, LINEAR FILTERING, SIGNALS

IDENTIFIERS: (U) *Density functions, Schur concavity, WJAFOSR2304A5, PER1102F

IDENTIFIERS: (U) WJAFOSR2304A5, PER1102F

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SEARCH CONTROL NO. EVN34M

AD-A189 936 20/9 20/7

AD-A189 935 12/1

COLORADO UNIV AT BOULDER CO DEPT OF ASTROPHYSICAL SCIENCE

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) Ion Transport in Beam-Plasma Interactions.

(U) Smooth Nonparametric Quantile Estimation Under Censoring: Simulations and Bootstrap Methods.

DESCRIPTIVE NOTE: Final rept. 30 Sep 83-29 Mar 85.

DESCRIPTIVE NOTE: Technical rept.,

MAY 85 12P

MAY 86 29P

PERSONAL AUTHORS: Stern, R. A. ;

PERSONAL AUTHORS: Padgett, W. J. ; Thomas, L. A. ;

REPORT NO. 153-3223-F

REPORT NO. TR-116, 82N05-17

CONTRACT NO. AFOSR-83-0325

CONTRACT NO. AFOSR-84-0156, MIPR-ARO-139-85

MONITOR: AFOSR

PROJECT NO. 2304

TR-88-0423

TASK NO. A5

UNCLASSIFIED REPORT

ABSTRACT: (U) The project is concerned with the interaction of ion beams and plasmas, and their mutual destabilization. The goal is to characterize this interaction using novel diagnostic techniques. In the experiment, a gas discharge plasma was to be constructed through which ions could be accelerated. A two laser system would be assembled and variations of laser induced fluorescence (LIF) diagnostics used to measure the changes in ion properties of the beam and the plasma consequent on the instability.

DESCRIPTORS: (U) *ION BEAMS, *PLASMA DIAGNOSTICS, *PULSED RADIATION, *DIAGNOSTICS(GENERAL), GAS DISCHARGES, INTERACTIONS, ION EXCHANGE, IONS, PLASMAS(PHYSICS), TRANSPORT PROPERTIES, LASER INDUCED FLUORESCENCE

IDENTIFIERS: (U) Plasma instabilities

AD-A189 938

DESCRIPTORS: (U) *ESTIMATES, *NONPARAMETRIC STATISTICS,

AD-A189 935

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UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this paper are two-fold. One is to report results of extensive Monte Carlo simulations which demonstrate the behavior of the mean squared error of the kernel estimator with respect to bandwidth. These simulations provide a method of choosing an optimal bandwidth when the form of the lifetime and censoring distributions are known. Also, they compare the kernel-type estimator with the product-limit quantile estimator. Five commonly used parametric lifetime distributions, two censoring mechanisms, and four different kernel functions are considered in this study, which is an extension of the brief simulations for exponential distributions reported by Padgett (1986). The second objective is to present a nonparametric method for bandwidth selection based on the bootstrap for right-censored data. This data-based procedure used the bootstrap to estimate mean squared error, and is both an extension and modification of the methods proposed by Padgett. Bandwidth selection using the bootstrap is important for small and moderately large samples since no exact expressions exist for the mean squared error of the kernel-type quantile estimator.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A168 935 CONTINUED

MONTI CARLO METHOD, ASYMPTOTIC NORMALITY, KERNEL
FUNCTIONS, BANDWIDTH, CONFIDENCE LIMITS

IDENTIFIERS (U) *Quantile functions, Bootstrap method,
Smoothed (mathematic), Lifetime distribution,
MVAPOS, 10445, PE61102F

AD-A168 934 8/10 8/18

NEW YORK UNIV N Y

(U) Perceptual factors in workload: A Neuromagnetic Study.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Jan-31 Dec 88,

FEB 88 SSP

PERSONAL AUTHORS: Kaufman, Lloyd ; Williamson, Samuel J. ;

CONTRACT NO. F49620-88-K-0004

PROJECT NO. 2313

TASK NO. A4

REMITOR: AFOSR
TR-88-0417

UNCLASSIFIED REPORT

ABSTRACT: (U) A background section describes the neuromagnetic method and its history. There were an elevation of M1 and P2 (using a quasi-steady state stimulus). The fields associated with these sources increased in intensity during attention. This is not due to the activity of sources recruited during attention, but to modulated activity of neurons in or near primary auditory cortex. This is consistent with a Trieman like filter theory of attention. Also, physical parameters of stimulation, e.g., loudness, have little or no effects. However, the effect is sharply diminished when both stimuli are presented to both ears with equal loudness. A collaboration with other investigators is planned to compare our results with results obtained in a more conventional manner. A new method for obtaining graded levels of attention is described. A visual experiment is underway, and is giving us similar results. A single-position method for determining the location, orientation and strength of the dipole source is described. This method will be applied to a P300 study, which will follow-up an odd-ball study just completed. The latter gave results similar to those obtained previously, but the method is sufficiently insensitive to determine if changing P300 latency is due to a change in source. The planned experiment should make this possible.

DESCRIPTORS: (U) *ATTENTION, *HEARING, *NEUROPHYSIOLOGY,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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*MAGNETOENCEPHALOGRAMS, DIPOLES, L'JONNESS, PERCEPTION, SOURCES, STIMULI, THEORY, VISION, WORKLOAD, MAGNETOMETERS, ELECTROENCEPHALOGRAPHY, COMPUTER APPLICATIONS, TOMOGRAPHY, MAGNETIC RESONANCE, IMAGE PROCESSING, NERVE TRANSMISSION, AUDITORY PERCEPTION

IDENTIFIERS: (U) Neuromagnetism, Event related potentials, WJAFOSR2313A4, PS81102F

AD-A188 833 7/4

TORONTO UNIV (ONTARIO) LASH MILLER CHEMICAL LABS

(U) Study in Molecular Lasers.

DESCRIPTIVE NOTE: Final rept. 1 Jun 84-31 May 85.

AUG 85 7P

PERSONAL AUTHORS: Burns, George ;

CONTRACT NO. AFOSR-84-0127

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-0422

UNCLASSIFIED REPORT

ABSTRACT: (U) Principal progress was achieved in the field classical studies of diatom dissociation. 3-D trajectory calculations of dissociating bromine and fluorine were conducted over a range of temperatures, and using several significantly different potential energy surfaces. A library consisting over a two million trajectories was accumulated. These trajectories were used to test the strong collision assumption, important in several theories of unimolecular reactions and in some theories of thermal diatom dissociation. The assumption was shown to be not valid for the case of dissociating bromine and fluorine. Properties of the steady state of dissociating diatoms were investigated. Papers, now in preparation, involve study of nonequilibrium energy and angular momentum distribution functions; accumulation, interpretation and classification of data on inelastic and reactive collisions; and study of scaling factors and vibrational-rotational coupling in dissociating diatoms. Experiments, still in progress, aimed at measuring recombination rates of fluorine atoms. Time delayed photoelectric effect was explained in terms of a release of trapped electrons at the surface of photocathode.

DESCRIPTORS: (U) *DIATOMIC MOLECULES, *CHEMICAL DISSOCIATION, *RECOMBINATION REACTIONS, *BROMINE, *FLUORINE, TRAJECTORIES, THREE DIMENSIONAL, TEMPERATURE, POTENTIAL ENERGY, SURFACES, COLLISIONS, ELECTRON TRANSFER,

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SEARCH CONTROL NO. EVN34M

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MOLECULAR VIBRATION, MOLECULAR ROTATION, PHOTOELECTRIC
EFFECT, ARCON

GEORGIA INST OF TECH ATLANTA

IDENTIFIERS (U) Atom molecule interactions,
WJAFOSR230381, PE81102F

(U) Extreme Values of Birth and Death Processes and Queues,

MAR 88 28P

PERSONAL AUTHORS: Serfozo, Richard P. ;

CONTRACT NO. AFOSR-84-0387

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-88-0384

UNCLASSIFIED REPORT

ABSTRACT: (U) This document studies the asymptotic behavior of maximum values of birth and death processes over large time intervals. In most cases, the distributions of these maxima, under standard linear normalizations, either do not converge or they converge to a degenerate distribution. However, by allowing the birth and death rates to vary in a certain manner as the time interval increases, we show that the maxima do indeed have three possible limit distributions. Two of these are classical extreme value distributions and the third one is a new distribution. This third distribution is the best one for practical applications. Our results are for transient as well as recurrent birth and death processes and related queues. For transient processes, the focus is on the maxima conditioned that they are finite. (Author)

DESCRIPTORS: (U) *STATISTICAL DISTRIBUTIONS, *TIME INTERVALS, QUEUEING THEORY, VALUE, CONVERGENCE, ASYMPTOTIC NORMALITY

IDENTIFIERS: (U) *Birth and death processes,
WJAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A168 931 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Validity of Edgeworth Expansions of Minimum Contrast Estimators for Gaussian ARMA Processes.

DESCRIPTIVE NOTE: Technical rept..

DEC 74 45P

PERSONAL AUTHORS: Taniguchi, Masanobu ;

REPORT NO. TR-88-48

CONTRACT NO. F49620-88-C-0008

PROJECT NO. 2304

TASK NO. A5

UNITOR: AFOSR
TR-88-0388

UNCLASSIFIED REPORT

ABSTRACT: (U) Let $(X \text{ sub } t)$ be a Gaussian Autoregression Multivariant Analysis (ARMA) process with spectral density $f \text{ sub } p(\lambda)$, where p is an unknown parameter. To estimate multivariant analysis we propose a minimum contrast estimation method which includes the maximum likelihood method and the quasi-maximum likelihood method as special cases. Let $p\text{-bar}$ sub T be the minimum contrast estimator of p . Then we derive the Edgeworth expansion of the distribution of $p\text{-bar}$ sub T up to third order, and provide its validity. By this Edgeworth expansion we can see that this minimum contrast estimator is always second-order asymptotically efficient in the class of second-third-order asymptotic comparisons among minimum contrast estimators will be discussed.

DESCRIPTORS: (U) *MULTIVARIATE ANALYSIS, *REGRESSION ANALYSIS, CONTRAST, ESTIMATES, MAXIMUM LIKELIHOOD ESTIMATION, GAUSSIAN QUADRATURE, ASYMPTOTIC SERIES, STOCHASTIC PROCESSES

IDENTIFIERS: (U) ARMA(Autoregression Multivariate Analysis), Edgeworth expansion, WJAFOSR2304A5, PE81102F

AD-A168 931

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AD-A168 930 9/2

MASSACHUSETTS UNIV AMHERST DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Yield and Performance Enhancement through Redundancy in VLSI and MSI Multi-Processor Systems.

DESCRIPTIVE NOTE: Technical rept..

86 52P

PERSONAL AUTHORS: Koren, Israel ; Pradhan, Dhiraaj K. ;

CONTRACT NO. AFOSR-84-0052

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-88-0389

UNCLASSIFIED REPORT

ABSTRACT: (U) New challenges have been brought to fault-tolerant computing and processor architecture research because of developments in IC technology. One emergent area is development of architectures, built by interconnecting a large number of processing elements on a single chip or wafer. Two important areas, related to such VLSI processor arrays, are the focus of this paper; they are fault-tolerance, and yield improvement techniques. Fault-tolerance in these VLSI processor arrays is of real practical significance; it provides for much-needed reliability improvement. Therefore, we first describe the underlying concepts of fault-tolerance at work in these multi-processor systems. These precepts are useful to then present certain techniques that will incorporate fault-tolerance integrally into the design. In the second part of the paper we discuss models that evaluate how yield enhancement and reliability improvement may be achieved by certain fault-tolerant techniques. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, MULTIPROCESSORS

IDENTIFIERS: (U) VLSI(Very Large Scale Integration), WJAFOSR2304A2, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 928 8/2

WISCONSIN UNIV-MADISON, DEPT OF COMPUTER SCIENCES

(U) SOR (Successive Over-Relaxation) MGR (Multigrid Algorithm)(nu) Experiments on the Crystal Multicomputer.

JAN 88 48P

PERSONAL AUTHORS: Kamowitz, David ;

CONTRACT NO AFOSR-82-0278, NSF-MCS81-05804

PROJECT NO 2304

TASK NO. A3

MONITOR: AFOSR
TR-88-0411

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes distributed implementations of the red/black SOR algorithm and of the MGR(nu) multigrid algorithm on the Crystal multicomputer. Rates of convergence and observed efficiencies for both algorithms are compared. Keywords: Distributed computing; Multigrid algorithm; Successive overrelaxation method.

DESCRIPTORS: (U) *ALGORITHMS, *MULTIPROCESSORS, BLACK(COLOR), EFFICIENCY, LINEAR SYSTEMS, CONVERGENCE, RATES, RED/COLOR, DIFFERENTIAL EQUATIONS, SOLUTIONS(GENERAL), ITERATIONS

IDENTIFIERS: (U) *Implementation, *Multicomputers, WJAFOSR2304A3, PEG1102F

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AD-A188 928 20/11 22/2

MASSACHUSETTS INST OF TECH CAMBRIDGE MA SPACE SYSTEMS LAB

(U) Development of Finite Active Control Elements for Large Flexible Space Structures.

DESCRIPTIVE NOTE: Annual rept. 18 Mar 83-14 May 84.

JUN 85 225P

PERSONAL AUTHORS: Miller, David W. ; Grayley, Edward F. ;

REPORT NO. MIT-SSL-8-88

CONTRACT NO. F49620-83-K-0028

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR
TR-88-0480

UNCLASSIFIED REPORT

ABSTRACT: (U) A quasi free-free beam, simulating a flexible space structure, was equipped with inertial proof-mass actuators and sensors capable, in principle, of functioning in the space environment. Then tuning rules were derived which determine the optimal actuator passive stiffness and damping which minimizes the control effort required while increasing the modal damping in the structure. Active control using two local and one component level processor was demonstrated next. Lastly, multi-input, single output collocated feedback tests were performed. Optimal passive vibration absorber designs were derived to provide maximum structural damping. Theoretically, addition of an absorber mass equaling 0.5% of structural mass can result in a single mode structural damping ratio of 5%. Analysis of multimode damping using a single absorber indicated that the absorber stiffness should be tuned to the lowest mode in order to maximize the achievable damping in all the modes. Passive actuator components and active feedback gains were derived simultaneously and sequentially yielding identical results whose passive components equal those of the passive vibration absorber. Passive absorber and active feedback damping tests were performed. A single mode

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 928 CONTINUED

damping ratio of 4.2% was achieved by adding 2.3% of structural mass; 77% of which corresponds to 'dead' absorber mass. Multi-input, single-output control provided damping ratios ranging from 2% to 3%. This functioning collocated control element, composed of actuators, sensors and local and component level processors, constitutes the first stage of research and experimentation into distributed, hierarchic active control of elastic structural behavior.

DESCRIPTORS: (U) *DAMPING, *FLEXIBLE STRUCTURES, *BEAMS(STRUCTURAL), VIBRATION, SPACE ENVIRONMENTS, ACTUATORS, PASSIVE SYSTEMS, TUNING, FEEDBACK, STIFFNESS, ENERGY ABSORBERS, STRUCTURAL RESPONSE, CONTROL SYSTEMS, DETECTORS, HIERARCHIES, DISTRIBUTION, ELASTIC PROPERTIES, MASS, SPACE TECHNOLOGY, SIMULATION

IDENTIFIERS: (U) *Flexible space structures, Active control, Active damping, Active feedback gain, Distributed control, Hierarchic control, Modal damping, Vibration absorbers, PEG1102F, WUAFOSR230281

AD-A188 928 12/1

GEORGIA INST OF TECH ATLANTA

(U) Heredity of Stationary and Reversible Stochastic Processes.

DESCRIPTIVE NOTE: Technical rept.,

MAR 88 8P

PERSONAL AUTHORS: Serfozo, Richard P. ;

CONTRACT NO. AFOSR-84-0387

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0381

UNCLASSIFIED REPORT

ABSTRACT: (U) When a stochastic process (a random measure, set, field, etc. on a group) is stationary, ergodic, or reversible, then certain functions of this process inherit these properties. This document presents sufficient conditions for this inheritance. (Author)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, QUEUEING THEORY, TRANSFORMATIONS(MATHEMATICS), STATIONARY, REVERSIBLE, ERGODIC PROCESSES, INVARIANCE

IDENTIFIERS: (U) PEG1102F, WUAFOSR2304A5

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CALIFORNIA UNIV LOS ANGELES DEPT OF MATERIALS SCIENCE
AND ENGINEERING(U) New Materials for Spacecraft Stability and Damping - A
Feasibility Study.DESCRIPTIVE NOTE: Final technical rept. 1 Oct 83-30 Sep
84.

NOV 86

82P

PERSONAL AUTHORS: Mackenzie, John D. ;

CONTRACT NO AFOSR-83-0221

PROJECT NO 2303

TASK NO. A3

MONITOR: AFOSR

TR-86-0308

UNCLASSIFIED REPORT

ABSTRACT: (U) A preliminary feasibility study has been conducted on some new materials for use as structure components of spacecrafts. These included some new glasses, glass-ceramics, fibers and composites such as low expansion copper aluminosilicate glasses, hollow and oval glass fibers and hollow fiber-glass-polymer composites. The low temperature expansion coefficients, elastic moduli and damping constants were measured. Recommendations are made for further research and development of some selected materials which appeared to be promising candidates for spacecraft structures.

DESCRIPTORS: (U) *GLASS FIBERS, *GLASS, COEFFICIENTS, CONSTANTS, DAMPING, EXPANSION, LOW TEMPERATURE, MODULUS OF ELASTICITY, SPACECRAFT, STABILITY, STRUCTURAL MEMBERS, STRUCTURES, CERAMIC MATERIALS, COPPER, GLASS REINFORCED PLASTICS, THERMAL EXPANSION, TEMPERATURE COEFFICIENTS, SPACECRAFT COMPONENTS

IDENTIFIERS (U) Aluminosilicate glass, hollow fibers, oval fibers, Damping materials, Engineering materials, WJAFOSR2303A3, PE81102F

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AD-A188 782

VIRGINIA INST OF MARINE SCIENCE GLOUCESTER POINT DEPT OF
CHEMICAL OCEANOGRAPHY(U) Investigation of Deviations from Ideality in the Two
Liquid Phase Region of Systems of Medium Molecular
Weight Hydrocarbon Mixtures and Water.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Dec 85.

FEB 88

118P

PERSONAL AUTHORS: Burris, David R. ; MacIntyre, William G. ;

CONTRACT NO. AFOSR-83-0038

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR

TR-86-0387

UNCLASSIFIED REPORT

ABSTRACT: (U) Two-phase systems of liquid hydrocarbon mixture, containing medium molecular weight aromatic and aliphatic hydrocarbons, and water were examined in both equilibrium and kinetic experiments. Knowledge of the aqueous solution behavior of liquid hydrocarbon mixtures is important in determining the fate of hydrocarbon components of fuels and petroleum in environmental release situations. The equilibrium solute concentration for a component is given by the product of the pure compound solubility, its mole fraction in the hydrocarbon phase and its activity coefficient in the hydrocarbon phase. Hydrocarbon phase activity coefficients determined for binary hydrocarbon mixtures using static vapor pressure measurements (at 20 and 70 degs.) and those determined using water solubility results (at 20 and 70 degs.) did not differ significantly. This indicated that component aqueous phase activity coefficients did not decrease measurably in the presence of hydrocarbon co-solutes, in contradiction to some previously published observations, and that the presence of water in the hydrocarbon phase was not significant at these temperatures. Methods for predicting multicomponent mixture solubilities were demonstrated. Aqueous solution behavior of mixtures containing a chlorinated hydrocarbon

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AD-A168 747 11/8 20/11

or a fatty acid surfactant was also determined.

DESCRIPTORS: (U) *HYDROCARBONS, *REACTION KINETICS, *SOLUBILITY, MIXTURES, WATER, AROMATIC HYDROCARBONS, ALIPHATIC HYDROCARBONS, MOLECULAR WEIGHT, CHEMICAL EQUILIBRIUM, LIQUID PHASES, SOLUTIONS, THERMODYNAMICS, VAPOR PRESSURE, TEMPERATURE, CHLORINATED HYDROCARBONS, FATTY ACIDS, SURFACE ACTIVE SUBSTANCES, CONCENTRATION(CHEMISTRY), COEFFICIENTS, BINARY COMPOUNDS

IDENTIFIERS: (U) PB1102F, WUAFOSR230382

CALIFORNIA UNIV DAVIS DEPT OF MECHANICAL ENGINEERING

(U) Fundamental Investigations of Failure during Superplastic Forming Process.

DESCRIPTIVE NOTE: Final rept. 1 Feb 82-31 Jan 80.

APR 80 91P

PERSONAL AUTHORS: Mukherjee, Aniya K. ;

CONTRACT NO. AFOSR-82-0081

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-88-0482

UNCLASSIFIED REPORT

ABSTRACT: (U) The experimental work on both the base alpha-beta alloy (Ti-8Al-4V) and the Ni-modified alloy (Ti-8Al-4V-2Ni) showed that there is significant microstructural evolution during superplastic deformation. These structural evolutions affect the parameters for the constitutive equation for superplasticity. Contrary to model prediction, the strain rate sensitivity is found to be a function of temperature, in a way that exactly parallels the dependence of beta-volume fraction on temperature. An empirical equation has been proposed to characterize the non-steady state microstructure in terms of the dependence of strain hardening coefficient on temperature and strain rate. The maximum attainable ductility in this alloy is associated with a dynamic balance between strain hardening (due to grain growth) and strain softening (due to in situ grain refinement). The 7475-TR8 aluminum alloy (heat 8) undergoes significant level of strain hardening due to increase in dislocation density as a function of strain. The grains do not remain equiaxed (which is contrary to most supposition of superplasticity). One does not observe a true steady-state in the microstructure during superplastic deformation. The activation energy of deformation is equal to that for volume diffusion, possibly due to the necessity of the dislocations to climb over the Cr-rich particles. The alloy cavitates

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extensively due to decohesion of the intermetallic particle/grain boundary interface.

DESCRIPTORS: (U) *TITANIUM ALLOYS, *ALUMINUM, *VANADIUM, *METALWORKING, ACTIVATION ENERGY, BALANCE, CLIMBING, COEFFICIENTS, DEFORMATION, DENSITY, DIFFUSION, DISLOCATIONS, DUCTILITY, DYNAMICS, EQUATIONS, EVOLUTIONS(GENERAL), FAILURE, GRAIN GROWTH, GRAIN STRUCTURES(METALLURGY), MICROSTRUCTURE, MODELS, PLASTIC PROPERTIES, PREDICTIONS, REFINING, SENSITIVITY, STEADY STATE, STRAIN HARDENING, STRAIN RATE, STRAIN(MECHANICS), TEMPERATURE, VOLUME, NICKEL

IDENTIFIERS: (U) Titanium alloy 6Al 4V, Titanium alloy 6Al 4V 2Ni, PE81102F, WUAFOSR2308A1

AD-A188 717 12/1 9/4

CONNECTICUT UNIV STORRS DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) Outlier Resistant Filtering and Smoothing.

DESCRIPTIVE NOTE: Interim rept. 1 Jul 85-30 Jun 86,

APR 86 68P

PERSONAL AUTHORS: Tsaknakis, Haralambos; Patantoni-Kazakos, P.;

REPORT NO. UCT/DECS/TR-86-6

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0365

UNCLASSIFIED REPORT

ABSTRACT: (U) Consider a stationary Gaussian information process transmitted through an additive noise channel. Assume that the noise and information processes are mutually independent, and model the noise process as nominally Gaussian with additive independent outliers. For the above system model, one first develop a theory for outlier resistant filtering and smoothing operations. Then design specific such nonlinear operations, and study their performance. The performance criteria are asymptotic mean squared error at the Gaussian model, the breakdown point, and the influence function. The operations combine excellent at the nominal model performance, with strong resistance to outliers. Keywords: Filtering; Smoothing; Qualitative robustness; Outlier Resistance.

DESCRIPTORS: (U) *INFORMATION PROCESSING, *MATHEMATICAL FILTERS, *STOCHASTIC PROCESSES, CHANNELS, NOISE, NONLINEAR SYSTEMS, OPERATION, RESISTANCE, GAUSSIAN QUADRATURE

IDENTIFIERS: (U) Outliers(Statistics), Robust procedures, Smoothing, PE81102F, WUAFOSR2304A5

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CALIFORNIA UNIV IRVINE CENTER FOR THE NEUROBIOLOGY OF
LEARNING AND MEMORY

DAYTON UNIV OH RESEARCH INST

(U) Conference on the Neurobiology of Learning and Memory
(2nd).

(U) Symposium on Applied Surface Analysis (7th) Held in
College Park, Maryland on 15-17 May 1985.

DESCRIPTIVE NOTE: Final rept. 1 Jul 84-30 Jun 85.

DESCRIPTIVE NOTE: Final rept. 18 Mar 85-30 Mar 86.

MAY 86 82P

JUL 86 82P

PERSONAL AUTHORS: McLaugh, James L. ;

PERSONAL AUTHORS: Grant, John T. ;

CONTRACT NO. N00014-84-Q-0108

REPORT NO. UDR-TR-86-80

UNCLASSIFIED REPORT

CONTRACT NO. N00014-85-C-0118

UNCLASSIFIED REPORT

ABSTRACT: (U) Funds from this grant provided partial support for the Second Conference on the Neurobiology of Learning and Memory which was organized by the Center for the Neurobiology of Learning and Memory at the University of California, Irvine, and was held on October 8-9, 1984. The symposium focused on three major topics: Brain systems and learning; Comparative aspects of learning and memory; and Learning, memory and cognitive processes. The program consisted of presentations by 18 major speakers and 83 poster presentations, and was attended by over 300 participants.

DESCRIPTORS: (U) *NEUROBIOLOGY, *LEARNING,
*MEMORY(PSYCHOLOGY), BRAIN, CALIFORNIA, COGNITION,
SYMPOSIA, CONGRUION

ABSTRACT: (U) Areas receiving special attention at this symposium were: chemical bonding and reactions at metal-semiconductor interfaces; surface analysis and the tribological processes of ion implanted materials; microbeam analysis; and laser ionization of sputtered neutrals. Other topics discussed included adsorption, adhesion, corrosion, wear, and thin films. The proceedings of the symposium have been published in a special issue of the journal: Applied Surface Science. (Abstracts)

DESCRIPTORS: (U) *SEMICONDUCTORS, *SURFACE ANALYSIS,
*SURFACE CHEMISTRY, ABSTRACTS, ADHESION, ADSORPTION,
CHEMICAL BONDS, CORROSION, INTERFACES, ION IMPLANTATION,
IONIZATION, LASERS, MATERIALS, METALS, MICROBEAMS,
SURFACES, SYMPOSIA, THIN FILMS

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AD-A169 113 10/2

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

TEXAS TECH UNIV LUBBOCK PULSED POWER LAB

(U) Reliability Analysis of a Communication Network with Multicomponent Components.

(U) Coordinated Research Program in Pulsed Power Physics.

DESCRIPTIVE NOTE: Annual rept. 10 Jan 84-31 Oct 85.

APR 86 BP

DEC 85 202P

PERSONAL AUTHORS: Crizou, Shen-Nong ; Li, Victor O. ;

PERSONAL AUTHORS: Kristiansen, M. ; Schaefer, G. ; Schoenbach, K. ; Kroschwitz, H. ;

CONTRACT NO AFOSR-84-0289

CONTRACT NO. AFOSR-84-0032

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A5

TASK NO. A7

MONITOR: AFOSR TR 86-0331

MONITOR: AFOSR TR-86-0305

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at IEEE INFOCOM, Miami, FL, 7-10 Apr 86

ABSTRACT: (U) This paper presents a model to calculate the reliability of communication networks with multicomponent components. Previous research on network reliability has focused on models in which each component may be in one of two modes, such as the probability that a pair of nodes is connected, are not meaningful in a multicomponent model. Therefore, the mean message delay of the network is defined as the performance measure. An exact calculation of this reliability measure is not feasible due to the large number of network states, corresponding to network components being in different modes. We have developed an approximation method to calculate this reliability measure. This method requires us to work with the states of the network in order of decreasing probability. An algorithm ORDER-N is developed to generate these states in the proper order.

DESCRIPTORS: (U) COMMUNICATIONS NETWORKS, DELAY, MEAN MESSAGE PROCESSING, MODELS, MULTIMODE NETWORKS, MODES, PARTS, RELIABILITY, RELIABILITY (ELECTRONICS), MATHEMATICAL MODELS, REPRINTS

IDENTIFIERS (U) WUAFOSR2304A5

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ABSTRACT: (U) The program's, related to pulsed power research, main emphasis is on gaining a better understanding of repetitive opening and closing switch phenomena. The main effort is on diffuse discharge opening switch phenomena. The main effort is on diffuse discharge opening switches but considerable progress has also been made on understanding and describing fundamental, transient discharge phenomena. Some effort has also been given to studies of electrode erosion and insulator damage in high power closing switches. In addition several smaller studies have considered various novel ideas and concepts to determine their potential for further investigations. Keywords: Pulsed power; Diffuse discharges; Opening switches; Laser triggering; Surface discharges; Field distortion; Streak photography; X ray triggering.

DESCRIPTORS: (U) PULSE GENERATORS, ELECTRIC SWITCHES, TRIGGER CIRCUITS, ELECTRODES, EROSION, ELECTRIC DISCHARGES, PULSE RATE, LASER APPLICATIONS, ELECTRIC ARCS, SPARK GAPS, SWITCHES, DIFFUSION, HIGH POWER, OPENING (PROCESS), POWER, PULSES, STREAK CAMERAS, DISTORTION, TRANSIENTS, X RAYS

IDENTIFIERS: (U) PE81102F, WUAFOS2301A7

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SEARCH CONTROL NO. EVN34M

AD-A188 108 12/1

AD-A188 073 17/9 17/3

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) On the Bounded Regret of Empirical Bayes Estimators.
DESCRIPTIVE NOTE: Technical rept.,

(U) A High Resolution Algorithm for Combined Time-of-Arrival and Direction-of-Arrival Estimation.

MAY 86 21P

DESCRIPTIVE NOTE: Rept. for 1984-1985.

PERSONAL AUTHORS: Yu, Kai F. ;

NOV 85 BP

REPORT NO. TR-112

PERSONAL AUTHORS: Spielman, Daniel ; Paulraj, A. ; Kallath, Thomas ;

CONTRACT NO. AFOSR-84-0186

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A5

TASK NO. A5

MONITOR: AFOSR
TR-88-0276

MONITOR: AFOSR
TR-88-0286

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) In the first Jerzy Neyman Memorial Lecture, Robbins (1983) has outlined a wide class of problems concerning the general empirical Bayes approach and the linear empirical Bayes approach to estimation. This paper studies a special case which includes several important standard distributions. Specifically let (θ, x) be a random vector such that θ has a distribution function G , and the conditional expectation of x given θ satisfies $E(x|\theta) = \theta$. Suppose it is desired to use a linear function Ax of the observed x to estimate the unknown parameter θ .

SUPPLEMENTARY NOTE: Pub. in Asilomar Conference Proceedings, 6 Nov 85.

ABSTRACT: (U) Over the past few years several high resolution methods for direction finding with passive arrays have been developed. In this paper, we use one of these methods, the MUSIC algorithm, to solve a two dimensional radar problem. Namely, given an antenna array and a transmitter which emits finite duration pulses, we wish to determine both the range and direction of multiple targets from the backscattered echoes. We show how the MUSIC algorithm can be adapted to this situation. Simulations are presented which show good performance. Keywords: High resolution algorithm; Time-of-arrival; Direction-of-arrival estimation; Antenna array; Radar and sonar applications. (Reprints)

DESCRIPTORS: (U) *BAYES THEOREM, *ESTIMATES, *FUNCTIONS (MATHEMATICS), LINEARITY, DISTRIBUTION FUNCTIONS; IDENTIFIERS: (U) PEB1102F, WJAFOSR2304A5

DESCRIPTORS: (U) *DIRECTION FINDING, *ALGORITHMS, *RADAR TRACKING, ANTENNA ARRAYS, ESTIMATES, HIGH RESOLUTION PASSIVE SYSTEMS, RADAR, REPRINTS, SONAR, TARGETS, TIME, TWO DIMENSIONAL, PROBLEM SOLVING, RADAR TRANSMITTERS, RADAR PULSES, BACKSCATTERING, RADAR ANTENNAS, TARGET ECHOES

IDENTIFIERS: (U) MUSIC algorithm, PEB1102F.

AD-A188 108

AD-A188 073

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AD-A189 073 CONTINUED
WUAFOSR2304AS

AD-A189 072 9/3
STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) A Time-Domain Signal Resolution Problem.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

APR 86 SP

PERSONAL AUTHORS: Bruckstein, A. M.; Shan, T. J.; Kallath, T.

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0272

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ICASSP Conference Proceedings,
Apr 86.

ABSTRACT: (U) This reprint presents a time-domain method for estimating the number and delay times for overlapping signals with a priori known shape, from noisy observations received by a sensor. The method is based on a recently developed eigenstructure technique for multiple direction finding with sensor arrays and exploits the structure of the received signal to variance matrix. The method presented also solves more general problems of signal detection and resolution. Keywords: MUSIC(Multiple Signal Characterization); Overlapping echoes; and MUSIC algorithm.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *TIME DOMAIN, DIRECTION FINDING, OVERLAP, RESOLUTION, DELAY, TIME, REPRINTS, DETECTION, SIGNALS, ALGORITHMS, ARRAYS, DETECTORS, REPRINTS

IDENTIFIERS: (U) MUSIC(Multiple Signal Characterization), MUSIC algorithm, PE81102F, WUAFOSR2304AS

AD-A189 073

AD-A189 072

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SEARCH CONTROL NO. EVN34W

AD-A188 063 11/8 20/11

AD-A188 047 8/16 8/1

CALIFORNIA UNIV BERKELEY

CALIFORNIA UNIV IRVINE CENTER FOR THE NEUROBIOLOGY OF LEARNING AND MEMORY

(U) International Conference/Workshop on Small Fatigue Cracks (2nd) Held in Santa Barbara, California on 8-10 January 1988.

(U) Effects of Acetylcholinesterase Inhibition on Cholinergic Transmission in the Hippocampal Slice.

DESCRIPTIVE NOTE: Final rept..

DESCRIPTIVE NOTE: Final rept. 1 Apr 82-30 Sep 85.

MAR 88 31P

APR 86 28P

PERSONAL AUTHORS: Ritchie, Robert O.; Lankford, James;

PERSONAL AUTHORS: Lynch, Gary;

CONTRACT NO. DAAG29-88-G-0110, AFOSR-85-0358

CONTRACT NO. AFOSR-82-0118

MONITOR: AFO, AFOSR

PROJECT NO. 2312

23038.1-MS-CF, IR-86-0608

TASK NO. A3

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-86-0288

UNCLASSIFIED REPORT

ABSTRACT: (U) This document provides a description and technical summary of the Second International Engineering Foundation Conference/Workshop on Small Fatigue Cracks, held in Santa Barbara, California, 8-10 January, 1988. It provides a current assessment of the pertinent issues with respect to definition, differences in behavior compared to long cracks, environmental effects, driving forces for small crack extension, intrinsic thresholds, and the application of small crack methodology to life prediction and alloy design. A listing of the conference participants and the technical program are appended to the report.

DESCRIPTORS: (U) *FATIGUE (MECHANICS), ALLOYS, CALIFORNIA, CRACKS, ENVIRONMENTAL IMPACT, INTERNATIONAL, METHODOLOGY, SYMPOSIA, WORKSHOPS, CRACK PROPAGATION, CRACKING (FRACTURING)

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ABSTRACT: (U) This work is concerned with the mechanisms used by brain cells to change their functional interconnections and the possibility that these are also involved in neuropathology. Three inter-related questions were studied: 1) What effects are produced in target neurons by prolonged exposure to neurotransmitters (e.g., acidic amino acids, acetylcholine); 2) Does partial degradation of the submembrane cytoskeleton by calcium-activated proteases (calpain) affect synaptic organization; 3) Are second messenger systems with known effects on growth (trophic) responses in peripheral tissues activated by intense physiological events in brain. Prolonged exposure of brain slices to acidic amino acid transmitters causes functional desensitization of extra-synaptic receptors, and a very potent inhibition of the second messenger system normally activated by cholinergic receptor. 2) Experiments concerned with synaptic structural proteins (brain spectrin or fodrin) and a proteolytic enzyme (calpain) that digests them produced the following results: a) degradation of spectrin by calpain changes irreversibly amino acid receptors; b) calpain is concentrated in synaptic regions; c) calpain-spectrin interactions in a test system (red blood cells) result in pronounced morphological changes; d) spectrin is rapidly synthesized, inserted into

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membrane domains, and apparently digested by calpain; e) the calpain-fodrin interaction is accelerated by calmodulin

DESCRIPTORS: (U) *NEUROCHEMICAL TRANSMISSION, *CHOLINE ESTERASE INHIBITORS, *HIPPOCAMPUS, ACETYLCHOLINE, ACETYLCHOLINE ESTERASE, ACTIVATION, AMINO ACIDS, BRAIN, CHOLINE, NERVOUS DEGRADATION, DESENSITIZING, ERYTHROCYTES, GROWTH(GENERAL), INHIBITION, MOLECULAR STRUCTURE, NERVE CELLS, NERVOUS SYSTEM, PATHOLOGY, POTENCY, PROTEINS, REGIONS, SENSE ORGANS, SYNAPSE, TISSUES(BIOLOGY), EXPOSURE(PHYSIOLOGY), MEMBRANES(BIOLOGY)

IDENTIFIERS: (U) Proteases, PEG1102F, WUAFOSR2312A3

AD-A169 020 9/2

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Adaptive Resolution of Overlapping Echoes.

NOV 88 7P

PERSONAL AUTHORS: Shan, T. J.; Bruckstein, A. M.; Kailath, T.

CONTRACT NO. DAAQ28-78-C-0218, DAAQ28-81-K-0387

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-86-0288

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Asilomar Conference, 8 Nov 88.

ABSTRACT: (U) We present a new adaptive method for estimating the arrival times for overlapping pulses with a priori known shape, from the noisy observations received by a sensor. The method is an adaptive version of an off-line technique based on the eigenstructure method for resolution of overlapping echoes. This problem is important in various applications such as radar and sonar data processing, geophysical/seismic exploration and biomedical engineering. In these applications a known signal is used to probe a medium and the returning response - in the form of delayed overlapping echoes in noise - has to be processed to yield information on the nature and location of scatterers.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *ECHOES, ADAPTIVE SYSTEMS, BIOMEDICINE, DATA PROCESSING, ENGINEERING, GEOPHYSICAL PROSPECTING, OFF LINE SYSTEMS, RADAR, RESOLUTION, SEISMOLOGY, SONAR, ARRIVAL, TIME, ESTIMATES, PULSES, DELAY, SCATTERING, SONAR SIGNALS, RADAR SIGNALS, REPRINTS

IDENTIFIERS: (U) Overlapping echoes, Arrival time, Adaptive resolution, Eigenstructure method, RF modulated signals, PEG1102F, WUAFOSR23/4A5

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AD-A168 942 12/1

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC
PROCESSES

(U) An Optimal Instruction-Scheduling Model for a Class of
Vector Processors.

(U) Weak Convergence of the Variations, Iterated Integrals,
and Doleans-Dade Exponentials of Sequences of
Semimartingales.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Technical rept.: Sep 85-Aug 88.

NOV 88 18P

MAR 88 8P

PERSONAL AUTHORS: Arya, Siamak ;

PERSONAL AUTHORS: Avram, F. ;

CONTRACT NO. AFOSR-84-0086

REPORT NO. TR-138

PROJECT NO. 2304

CONTRACT NO. F49620-85-C-0144

TASK NO. A3

PROJECT NO. 2304

MONITOR: AFOSR

TASK NO. A5

MONITOR: AFOSR
TR-88-0327

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Computers, VC-34 n11 p881-888 Nov 88.

UNCLASSIFIED REPORT

ABSTRACT: (U) An integer programming model that portrays
the architectural features of a class of vector and array
processors has been developed. This model is used to
produce optimal schedules for low-level instruction codes
of such processors. Optimal schedules are produced for
both straight codes and instruction loops. Loop
scheduling is separately considered because of special
consideration that must be given to the effects of the
instructions of consecutive loop iterations on each other
that are hidden when static instruction scheduling
approach is used. Using the model, a number of
experiments have been conducted in optimal scheduling of
Cray assembly codes. Keywords: Reprints; Computer
architecture (Author)

ABSTRACT: (U) This document investigates the weak
convergence of variations, iterated integrals and Doleans
Dade exponentials. V sub k (V), I sub k (V) and E (gamma V)
are called respectively the variations, the iterated
integrals and the Doleans-Dade exponential of the
semimartingale V .

DESCRIPTORS: (U) *WEAK CONVERGENCE, EXPONENTIAL
FUNCTIONS, INTEGRALS, VARIATIONS, SEQUENCES(MATHEMATICS),
ITERATIONS

IDENTIFIERS: (U) Semimartingales, PE81102F,
WJAFOSR2304A5

DESCRIPTORS: (U) *INTEGER PROGRAMMING, ARRAYS, ASSEMBLY,
CODING, COMPUTER ARCHITECTURE, COMPUTER PROGRAMMING,
INSTRUCTIONS, LOOPS, OPTIMIZATION, PROCESSING EQUIPMENT,
REPRINTS, SCHEDULING, COMPUTERIZED SIMULATION

IDENTIFIERS: (U) PE81102F, WJAFOSR2304A3

AD-A168 942

AD-A168 942

UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 841 12/1

AD-A188 893 8/20 8/13

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

STATE UNIV OF NEW YORK AT BINGHAMTON DEPT OF BIOLOGY

(U) Asymptotically Optimal Bandwidth Selection for Kernel Density Estimators from Randomly Right-Censored Samples

(U) Membrane Alterations Following Toxic Chemical Insect.

DESCRIPTIVE NOTE: Final rept. 15 Jul 84-14 Jan 88.

DESCRIPTIVE NOTE: Technical rept..

MAR 88 6P

MAR 88 27P

PERSONAL AUTHORS: Liss, Alan ;

PERSONAL AUTHORS: Marron, J. S. ; Padgett, W. J. ;

CONTRACT NO. AFOSR-84-0248

REPORT NO. TR-113

PROJECT NO. 2917

CONTRACT NO AFOSR-84-0186

TASK NO. A4

PROJECT NO 2304

MONITOR: AFOSR

TASK NO. A5

TR-86-0286

MONITOR: AFOSR
TR-86-0277

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper makes two important contributions to the theory of bandwidth selection for kernel density estimators under right censorship. First, an asymptotic representation of the integrated squared error into easily understood variance and squared bias components is given. Second, it is shown that if the bandwidth is chosen by the data-based method of least squares cross-validation, then it is asymptotically optimal in a compelling sense. A by-product of the first part is an interesting comparison of the two most popular kernel estimators. Keywords: Nonparametric density estimation, Smoothing parameter.

DESCRIPTORS (U) *ESTIMATES, *KERNEL FUNCTIONS, BANDWIDTH, CENSORSHIP, DATA BASES, DENSITY, NONPARAMETRIC STATISTICS, SELECTION, THEORY, LEAST SQUARES METHOD

IDENTIFIERS (U) PB91102F, WJAFDSR2304AS

AD-A188 841

UNCLASSIFIED

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ABSTRACT: (U) A prokaryotic cell system has been developed that can be used to determine the toxic action of chemicals acting at the level of the eucaryotic or prokaryotic cytoplasmic membrane. Cell wall-less microbes known as mycoplasmas are used. In this current study, two porphyrinated fatty acids (C8 and C10) were found to inhibit the growth of the fast mycoplasmas. Two apparent activities were observed. At high concentrations (> 10 mM) a detergent-like action was noted. At low concentrations (< 10 mM) cell death was observed without detectable cell lysis. Altering the cell membrane (the presumed target of the toxic compounds) resulted in altered levels of toxicity. The nature of the toxic action of the porphyrinated fatty acids is currently being investigated using sodium dodecyl sulfate polyacrylamide gel electrophoresis, high performance liquid chromatography and microbiological procedures (such as selecting toxin resistant mutants). Keywords: Mycoplasmas; Fluorocarbons; Toxic Chemicals.

DESCRIPTORS: (U) *TOXICITY, *FLUORINATED HYDROCARBONS, *FATTY ACIDS, *MEMBRANES, *MYCOPLASMA, CYTOPLASM, CELLS(BIOLOGY), CONCENTRATION(COMPOSITION), HIGH RATE, MICROBIOLOGY, FLUORINATION, CHEMICALS, TOXICITY, MUTATIONS, DEATH, GROWTH(GENERAL), HIGH RESOLUTION, LIQUID CHROMATOGRAPHY, RESISTANCE, TOXINS AND ANTITOXINS

AD-A188 893

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 883 CONTINUED

AD-A168 888 20/11 22/2

IDENTIFIERS: (U) PE81102F, WJAFOSR281744

WEA CAMBRIDGE MA

(U) Wave Propagation and Dynamics of Lattice Structures.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 83-30 Apr 84.

MAY 84 208P

PERSONAL AUTHORS: Williams, James H. , Jr.; Eng, Freddie C. ;
Lee, Samson S. ;

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2307

TASK NO. B1

MONITOR: AFOSR
TR-88-0281

UNCLASSIFIED REPORT

ABSTRACT: (U) The application of the transfer matrix method to the analysis of wave propagation and vibration in periodic structures is introduced. Analyses of a one-dimensional rod, a three-bay planar lattice structure and a three-dimensional tetrahedral truss are given to illustrate the general approach in applying the transfer matrix method. In addition, a numerical example is given. The frequency response functions for specific locations in a one-dimensional rod due to an excitation at a particular location are obtained using a basic language computer program. The responses at one location in the rod due to an impulse excitation, a square pulse excitation and a triangular pulse excitation at a second location are also obtained. Keywords: Large space structures.

DESCRIPTORS: (U) *SPACECRAFT, *LATTICE DYNAMICS, *STRUCTURAL ANALYSIS, COMPUTER PROGRAMS, EXCITATION, FREQUENCY RESPONSE, FUNCTIONS, ONE DIMENSIONAL, POSITION(LOCATION), PROGRAMMING LANGUAGES, PULSES, RODS, SQUARE WAVES, STRUCTURES, THREE DIMENSIONAL, TRUSSES, VIBRATION, WAVE PROPAGATION, TRANSFER FUNCTIONS, MATRICES(MATHEMATICS)

IDENTIFIERS: (U) BASIC programming language, PE81102F,
WJAFOSR230781

AD-A168 888

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AD-A168 883

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 866 20/12 20/2

AD-A168 786 17/2.1

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) High Speed Compound Semiconductor Devices in Layered Structures

(U) Multiple Signal Resolution with Uncertain Signal Subspace.

DESCRIPTIVE NOTE: Final rpt. 1 Jan 83-31 Dec 85.

NOV 85 8P

FEB 86 8AP

PERSONAL AUTHORS: Shan, T. J.; Bruckstein, A. M.; Kailath, T.

PERSONAL AUTHORS: Morkoc, M. ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. F49620-83-K-0021

PROJECT NO. 2304

PROJECT NO. 2305

TASK NO. A5

TASK NO. C1

MONITOR: AFOSR
TR-88-0267

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Much progress has been made in the growth of GaAs on Si. GaAs MESFETs, MOFETs, HBTs, lasers on Si, modeling of MESFETs and MOFET ring oscillators, InGaAs/AlGaAs MOFETs, InGaAs hot electron transistors, GaAs/AlAs resonant tunneling transistors, single and multi quantum wells. Accomplishments were reported in about 200 journal articles, 50 conference papers and 25 seminars over the past three years. Only the GaAs on Si, In sub yda sub-17As AlGaAs MOFET and InGaAs hot electron transistor related research accomplishments are summarized in this document. A list of publications covering all of the research funded by the AFOSR is provided as an appendix for those who are interested. (Author)

DESCRIPTORS: (U) SEMICONDUCTOR DEVICES, CRYSTAL GROWTH, DOCUMENTS, GALLIUM ARSENIDES, LAYERS, OSCILLATORS, QUANTUM ELECTRONICS, RINGS, STRUCTURES, TABLES (DATA), TRANSISTORS, SILICON, SEMICONDUCTOR LASERS, MONOLITHIC STRUCTURES (ELECTRONICS), INTEGRATED CIRCUITS

IDENTIFIERS: (U) PEB1102F, WJAFDSR2305C1

AD-A163 866

UNCLASSIFIED

PAGE 161 EVN34M

AD-A168 786

SUPPLEMENTARY NOTE: Pub in Asilomar Conference, n/s 5p, 8 Nov 85.

ABSTRACT: (U) An extension of the signal subspace algorithm for signal resolution is given for the case of incomplete information on the assumed 'signal subspace'. The algorithm is based on a multiplicative model of signal subspace uncertainty. In direction finding with sensor arrays this uncertainty model accounts for phase and gain perturbations in the sensors as well as for inaccurate knowledge of sensor positions. The proposed method for dealing with incomplete information on the signal subspace exploits the structure of the data model to first estimate the missing parameters by a 'signal implantation' technique. In direction finding the method amounts to using a predetermined set of signals arriving from known directions together with the signals originating at the real targets to enable on-line monitoring of sensor gain/phase perturbations and self-cohering of the signal subspace. Keywords include: Multiple signal resolution; Self-cohering approach; Sensor arrays; and Signal implantation technique. (Reprints)

DESCRIPTORS: (U) SIGNAL PROCESSING, RADIO SIGNALS, ALGORITHMS, DIRECTION FINDING, MODELS, MONITORING, ON LINE SYSTEMS, REPRINTS, DETECTORS, GAIN, PERTURBATIONS, SIGNALS, DATA MANAGEMENT, MULTIPLICATION FACTOR, TARGETS,

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OTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A188 796 CONTINUED

AD-A188 796 9/1

ADAPTIVE, IMPLANTATION

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

IDENTIFIERS: (U) *Multiple signal processing, Signal subspace, Signal implantation, WJAFOSR2304A5, PEG1102F

(U) Adaptive Filtering Algorithms with Automatic Gain Control,

NOV 88 6P

PERSONAL AUTHORS: Shan, T. J.; Kailath, T. ;

CONTRACT NO. F49620-78-C-0088, AFOSR-33-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0269

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Asilomar Conference, n19 6p,
6 Nov 88.

ABSTRACT: (U) In this paper we introduce an automatic gain control (AGC) scheme for adaptive algorithms that are used extensively in many applications. The proposed AGC scheme is realized by using an estimate of the cross correlation between adaptive error and the input signal to control the gain of the adaptive algorithm. When the cross correlation is high, the gain is also high, and the adaptive algorithm is in an 'active' state. When the error and the input signals are uncorrelated, the gain is near to zero, and the adaptive algorithm is put in an 'asleep' state. Thus, adaptive algorithms with such AGC are insensitive to disturbances appearing on the system output measurement. Such disturbances can drive conventional adaptive algorithms away from the achieved adaptation. A fast, efficient algorithm for estimation of the cross correlation coefficient of adaptive error and input is also proposed. Keywords: Adaptive filtering algorithms, Automatic gain control, Cross correlation, Channel echo-cancellation, Near-end speech.

DESCRIPTORS: (U) *ALGORITHMS, *AUTOMATIC GAIN CONTROL, *ADAPTIVE FILTERS, COEFFICIENTS, CONTROL, CROSS CORRELATION, ERRORS, INPUT, MEASUREMENT, OUTPUT, SENSITIVITY, SIGNALS, REPRINTS

AD-A188 796

AD-A188 795

UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 785 CONTINUED

IDENTIFIERS: (U) WUAFOSR2304AB, PE81102F

AD-A188 784 20/14 9/5

MARYLAND UNIV COLLEGE PARK LAB FOR PLASMA AND FUSION
ENERGY STUDIES

(U) Experimental and Theoretical Investigation of
Microwave Millimeter Radiation from Hollow, Rotating
Electron Beams.

DESCRIPTIVE NOTE: Final progress rept. 1 Dec 84-30 Nov 85.

NOV 85 109P

PERSONAL AUTHORS: Destler, William M. ;

CONTRACT NO. AFOSR-83-C013

PROJECT NO. 2301

TASK NO. AB

MONITOR: AFOSR
TR-88-0280

UNCLASSIFIED REPORT

ABSTRACT: (U) Research on microwave generation from rotating electron beams in various conducting boundary systems has been pursued with the major emphasis being on the production of radiation from rotating electron beams in magnetron like conducting boundary systems. These experimental configurations are now recognized as an entirely new type of microwave tube, referred to in the literature as a Gyromagnetron, High Harmonic Gyrotron, or Cusp Injected Magnetron (Cuspitron). The interest in this new device has centered around its potential to reduce the required magnetic field in microwave tubes by an order of magnitude by allowing operation at a high harmonic of the electron cyclotron frequency. Results from research on millimeter and submillimeter waves produced by rotating electron beams in rippled magnetic fields, are also summarized in this report.

DESCRIPTORS: (U) *ELECTRON BEAMS, *MICROWAVE TUBES, *MILLIMETER WAVES, *GYROTRONS, BOUNDARIES, CYCLOTRON WAVES, ELECTRONS, FREQUENCY, MAGNETIC FIELDS, MAGNETRONS, PRODUCTION, RADIATION, THEORY

IDENTIFIERS: (U) CUSPITRON(Cusp Injected Magnetron),
PE81102F, WUAFOSR2301AB

AD-A188 784

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AD-A188 785

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A168 788 9/1

AD-A168 772 14/2

ROCKWELL INTERNATIONAL THOUSAND OAKS CA
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTERSOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND
STATISTICS

(U) LSI/VLSI Ion Implanted Planar GaAs IC Processing.

(U) On Discrete Failure Models.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Mar 85.

AUG 85

5P

NOV 85 55P

PERSONAL AUTHORS: Padgett, V. J.; Spurrier, John D. ;

PERSONAL AUTHORS: Kirkpatrick, C. G. ;

CONTRACT NO. AFOSR-84-0188

REPORT NO. MRDC41129.12FA

PROJECT NO. 2304

CONTRACT NO. F49620-83-C-0042, ARPA Order-3384

TASK NO. A5

MONITOR: AFOSR
TR-86-0304MONITOR: AFOSR
TR-86-0315

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The scope of this program was two-fold: (1) to complete and stabilize the development of a planar fabrication process for high speed digital integrated circuits on 3-inch GaAs wafers, and (2) to utilize gate arrays up to the 1k equivalent gate level as the demonstration circuits for this process development. In addition to optimizing equipment and handling techniques for 3-inch GaAs wafers, the process development task concentrated on test chip characterizations, threshold voltage uniformity control, and materials evaluation. Piezoelectrically generated device non-uniformities were a primary consideration during this time. The gate array development involved two masked sets. The first was used to establish process and design criteria for gate arrays, as well as to fabricate a 8 x 8 multiplier. The second mask set was an extension of the previous work, and was used to fabricate gate arrays of the 1k equivalent gate complexity. The Mayo Foundation provided the expertise for auto-routing and personalization techniques. (Author)

DESCRIPTORS: (U) *INTEGRATED CIRCUITS, HIGH RATE, CIRCUITS, DEMONSTRATIONS, ARRAYS, GATES(CIRCUITS), GALLIUM ARSENIDES, ION IMPLANTATION, PLANAR STRUCTURES, FABRICATION, CHIPS(ELECTRONICS), HANDLING, MATERIALS, TEST AND EVALUATION, MASKS, THRESHOLD EFFECTS, VOLTAGE

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Reliability, VR-34 n3 p283-286 Aug 85.

ABSTRACT: (U) In some situations, discrete failure 'time' distributions are appropriate to model 'lifetimes'. For example, a discrete distribution is appropriate when a piece of equipment operates in cycles and the number of cycles prior to failure is observed. This paper provides three families of discrete parametric distributions which are versatile in fitting increasing, decreasing, and constant failure rate models to either uncensored or right-censored discrete life-test data. The maximum likelihood estimation of parameters, survival probabilities, and mean lifetime is investigated. The MLEs can be computed by simple numerical methods. (Reprints)

DESCRIPTORS: (U) *LIFE TESTS, CONSTANTS, CYCLES, DISCRETE DISTRIBUTION, FAILURE, MAXIMUM LIKELIHOOD ESTIMATION, MEAN, MODELS, NUMERICAL METHODS AND PROCEDURES, PARAMETRIC ANALYSIS, PROBABILITY, RATES, REPRINTS, SURVIVAL(GENERAL), TIME, PARAMETERS

IDENTIFIERS: (U) PEG1102F, WJAFOSR2304A5

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10-A101	753	19/4	20/10	20/4
10-A102	754	19/4	20/10	20/4
10-A103	755	19/4	20/10	20/4
10-A104	756	19/4	20/10	20/4
10-A105	757	19/4	20/10	20/4
10-A106	758	19/4	20/10	20/4
10-A107	759	19/4	20/10	20/4
10-A108	760	19/4	20/10	20/4
10-A109	761	19/4	20/10	20/4
10-A110	762	19/4	20/10	20/4
10-A111	763	19/4	20/10	20/4
10-A112	764	19/4	20/10	20/4
10-A113	765	19/4	20/10	20/4
10-A114	766	19/4	20/10	20/4
10-A115	767	19/4	20/10	20/4
10-A116	768	19/4	20/10	20/4
10-A117	769	19/4	20/10	20/4
10-A118	770	19/4	20/10	20/4
10-A119	771	19/4	20/10	20/4
10-A120	772	19/4	20/10	20/4
10-A121	773	19/4	20/10	20/4
10-A122	774	19/4	20/10	20/4
10-A123	775	19/4	20/10	20/4
10-A124	776	19/4	20/10	20/4
10-A125	777	19/4	20/10	20/4
10-A126	778	19/4	20/10	20/4
10-A127	779	19/4	20/10	20/4
10-A128	780	19/4	20/10	20/4
10-A129	781	19/4	20/10	20/4
10-A130	782	19/4	20/10	20/4
10-A131	783	19/4	20/10	20/4
10-A132	784	19/4	20/10	20/4
10-A133	785	19/4	20/10	20/4
10-A134	786	19/4	20/10	20/4
10-A135	787	19/4	20/10	20/4
10-A136	788	19/4	20/10	20/4
10-A137	789	19/4	20/10	20/4
10-A138	790	19/4	20/10	20/4
10-A139	791	19/4	20/10	20/4
10-A140	792	19/4	20/10	20/4
10-A141	793	19/4	20/10	20/4
10-A142	794	19/4	20/10	20/4
10-A143	795	19/4	20/10	20/4
10-A144	796	19/4	20/10	20/4
10-A145	797	19/4	20/10	20/4
10-A146	798	19/4	20/10	20/4
10-A147	799	19/4	20/10	20/4
10-A148	800	19/4	20/10	20/4
10-A149	801	19/4	20/10	20/4
10-A150	802	19/4	20/10	20/4
10-A151	803	19/4	20/10	20/4
10-A152	804	19/4	20/10	20/4
10-A153	805	19/4	20/10	20/4
10-A154	806	19/4	20/10	20/4
10-A155	807	19/4	20/10	20/4
10-A156	808	19/4	20/10	20/4
10-A157	809	19/4	20/10	20/4
10-A158	810	19/4	20/10	20/4
10-A159	811	19/4	20/10	20/4
10-A160	812	19/4	20/10	20/4
10-A161	813	19/4	20/10	20/4
10-A162	814	19/4	20/10	20/4
10-A163	815	19/4	20/10	20/4
10-A164	816	19/4	20/10	20/4
10-A165	817	19/4	20/10	20/4
10-A166	818	19/4	20/10	20/4
10-A167	819	19/4	20/10	20/4
10-A168	820	19/4	20/10	20/4
10-A169	821	19/4	20/10	20/4
10-A1				

CALIFORNIA UNIV DAVIS DEPT OF APPLIED SCIENCE

(iii) Fundamental study of Dense-Fluid Detonation.

DESCRIPTIVE NOTE: Final rpt. Apr 31-Sep 88.

SEP 15 408

PERSONAL AUTHOR: Hoover, William G. ;

CONTRACT NO F49620-81-C-0050. ARPA Order-4077

2017 OCT 09

TASK NO **13**

**MONITOR: AFOSR
TR-RN-0300**

UNCLASSIFIED REPORT

ABSTRACT: (U) Equations incorporating adiabatic, isothermal, and isonegative constraints are developed and applied to simulations of gases, liquids, and solids to obtain realistic fluid detonation wave profiles. The structure of uniaxially and hydrostatically compressed solids and the transfer of energy among translational and internal molecular modes are studied. Novel computational methods are developed simulating nonequilibrium processes using Gauss' principle of Least Constraint. Keywords: Detonation; Molecular Dynamics; Nonequilibrium Simulation; Hexanitrobenzene.

Internal molecular modes are studied. Novel computational methods are developed simulating nonequilibrium processes using Quass' Principle of Least Constraint. Keywords: Detonation; Molecular Dynamics; Nonequilibrium Simulation; Hexanitrobenzene.

DESCRIPTORS: (U) *DETONATION WAVES. *MOLECULAR PROPERTIES. *FLUIDS. *HIGH EXPLOSIVES. COMPRESSION. DYNAMICS. ENERGY TRANSFER. EQUATIONS. FLUIDS. GASES. NONEQUILIBRIUM FLOW. NUMERICAL METHODS AND PROCEDURES. PROFILES. SIMULATION. SOLIDS. COMPUTERIZED SIMULATION. SHOCK WAVES. NITROGEN OXIDES. DEFORMATION. NITROBENZENES. CONTINUUM MECHANICS

AD-A168 753

MPENAE

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AD-A168 781 9/1 20/12

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES

(U) Research in Adaptive and Decentralized Stochastic Control

(U) Research on Materials and Components for Opto-Electronic Signal Processing.

DESCRIPTIVE NOTE. Final rept. 18 Mar 84-14 Nov 85.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 84-30 Nov 85.

JAN 86 8P

DEC 85 18P

PERSONAL AUTHORS: Marcus, Steven I. ;

PERSONAL AUTHORS: Chang, William S. ; Kellner, Albert L. ; Van Eck, Timothy ; Malpita, L. M. ; Wiedner, H. H. ;

CONTRACT NO. AFOSR-84-0089

CONTRACT NO. AFOSR-84-0389

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A1

TASK NO. B1

MONITOR: AFOSR TR 88-0288

MONITOR: AFOSR TR-88-0283

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress was made in a number of aspects of stochastic systems. The problem of adaptive control of priority assignment in queueing systems was solved. A distance-measures approach to the problem of approximation and identification of queueing systems was studied. A problem of adaptively controlling a discounted-reward finite state Markov decision process was solved. Major new results were obtained for the problem of adaptive control with incomplete observations. In particular, the author studied in depth a problem of adaptive control with incomplete observations, in which the state is a finite state Markov process. In addition, earlier work on asymptotic approximations in non-linear filtering was completed. (Author)

DESCRIPTORS: (U) *ADAPTIVE CONTROL SYSTEMS, *STOCHASTIC CONTROL, APPROXIMATION(MATHEMATICS), ASYMPTOTIC SERIES, DECENTRALIZATION, FILTERS, IDENTIFICATION SYSTEMS, NONLINEAR SYSTEMS, QUEUEING THEORY, STOCHASTIC PROCESSES

IDENTIFIERS: (U) WUAFOSR2304A1, PEB1102F

AD-A168 782

AD-A168 781

UNCLASSIFIED

PAGE 186 EVN34M

ABSTRACT: (U) Electroabsorption and electrorefraction properties of heterostructures and multiple quantum-well structures in III-V semiconductors were investigated for spatial modulation and optical fibercommunication applications. Optical waveguides are fabricated and evaluated. A new device, the gate controlled photo diode (GCPD) has been conceived and demonstrated. It has potential applications in optical signal processing. Keywords: III-V Compound semiconductors; Electroabsorption; Electrorefraction; and Gated photo diode.

DESCRIPTORS: (U) *ELECTROOPTICS, *PHOTODIODES, *SEMICONDUCTORS, INDIUM PHOSPHIDES, GALLIUM ARSENIDES, REFRACTION, ALUMINUM GALLIUM ARSENIDE, FIBER OPTICS, CONTROL, GATES(CIRCUITS), GROUP III COMPOUNDS, GROUP V COMPOUNDS, OPTICAL PROCESSING, SIGNAL PROCESSING, MATERIALS, OPTICAL WAVEGUIDES, STRUCTURES, MODULATION, SPATIAL DISTRIBUTION

IDENTIFIERS: (U) Gated photodiodes, Electroabsorption, Electrorefraction, Quantum wells, MQW(Multiple Quantum Wells), Heterostructures, Gallium indium arsenides, WUAFOSR2305B1, PEB1102F

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 748 20/11 13/13

NORTHWESTERN UNIV EVANSTON IL

(U) Impact Response of Structures--Global Local Approach.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 83-30 Nov 84.

DEC 84. 81P

PERSONAL AUTHORS: Keer, Leon M. ;

CONTRACT NO. AFOSR-82-0330

PROJECT NO. 2302

TASK NO. 81

MONITOR: AFOSR
TR-88-0287

UNCLASSIFIED REPORT

ABSTRACT: (U) The response of an isotropic cantilever beam of finite length under the action of frictionless cylindrical and flat indenters is studied. Solutions are obtained through a local-global technique, which accounts for both the local behavior near the indenter, as well as the global beam behavior. The method of analysis superposes an infinite layer solution derived through the use of integral transmons with a pure bending beam theory solution. Local indenter stresses, as well as displacements and rotations are computed for each case and plotted for various ratios of contact width to beam length, and for various positions of the indenter. Where possible, the results are compared to Hertz theory of contact stresses and to beam displacement and rotation solutions. LOW VELOCITY IMPACT ON A CIRCULAR PLATE: An investigation was made on the low velocity impact on a circular plate by a rigid indenter. The plate response to impact shows some of but not all of the similar problem for a beam. The local contact stresses were developed from an elasticity theory, while the global stresses were obtained from plate theory.

DESCRIPTORS: (U) *STRESS STRAIN RELATIONS, *IMPULSE LOADING, *CANTILEVER BEAMS, STRESS ANALYSIS, METAL PLATES, CADMIUM, MAGNESIUM, AMINATES, COMPOSITE MATERIALS, DISPLACEMENT CYLINDRICAL BODIES, ELASTIC PROPERTIES, THEORY, GLOBAL, STRESSES, LAYERS, SOLUTIONS(GENERAL).

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AD-A188 748 CONTINUED
ISOTROPISM, IMPACT, LOW VELOCITY, LENGTH, BEHAVIOR,
RESPONSE, INTEGRAL TRANSFORMS, ROTATION
IDENTIFIERS: (U) Indentation, Indenters, WJAFOSR230281,
PEG1102P

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 745 5/10 5/18

AD-A188 745 CONTINUED

CALIFORNIA UNIV IRVINE COLL OF MEDICINE

DESCRIPTORS: (U) *STIMULATION(PHYSIOLOGY), *BEHAVIOR,
*RESPONSE, *DELAY, CUES(STIMULI), NEUROLOGY, ACQUISITION,
BRAIN, SIMULATION, CONTROL, GROUP DYNAMICS, LEARNING,
RATS, DELIVERY, INTERVALS, TIMING DEVICES, LOW RATE,
SECONDARY, REPRINTS

(U) Reinforcement Delay of One Second Severely Impairs
Acquisition of Brain Self-Stimulation.

85 8P

IDENTIFIERS: (U) Rewards, Reinforcement delay,
WUAFOSR2312A1, PEG1102F

PERSONAL AUTHORS: Black, Joel ; Belluzzi, James D. ; Stein,
Larry ;

CONTRACT NO. F49820-81-K-0018

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-86-0298

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Brain Research, v350 p113-119
1985.

ABSTRACT: (U) The effect of delayed reinforcement on the acquisition of lateral hypothalamic self-stimulation was investigated. Brain stimulation reinforcement minimizes cues associated with reinforcement delivery (secondary reinforcement) and, by eliminating consummatory responses, permits precise temporal control of the interval between the operant response and reinforcement. Different groups were trained in daily 1-h sessions for brain stimulation reinforcement at one of 4 delay intervals (1, 2, 3, or 6 s). Responses made during the delay interval were not reinforced and reset the delay timer. Control groups (IMMEDIATE) were reinforced immediately, but were required to space responses--according to a delayed reinforcement of low rates (DRL) schedule--for an interval corresponding to one of the delay of reinforcement intervals. The DRL schedule equalized opportunities for reinforcement and non-reinforcement. At all intervals, rats trained with delayed reinforcement had significantly lower bar-press rates than controls trained with immediate reinforcement under DRL. The results indicate that delays even as short as 1 s markedly impede the acquisition of self-stimulation behavior. Keywords: Reward and Learning

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AD-A188 738 8/2 14/4

AD-A188 738 CON INJED

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Evaluations of Software Technologies: Testing,
CLEANROOM, and Metrics.

DESCRIPTIVE NOTE: Technical rept.

MAY 88 198P

PERSONAL AUTHORS: Salby, Richard W., Jr.

REPORT NO. TR-1800

CONTRACT NO. F48620-80-C-0001, NSG-5123

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR 88-0278

UNCLASSIFIED REPORT

ABSTRACT: (U) A 7-step approach for quantitatively evaluating software technologies couples software methodology evaluation with software measurement. The approach is applied in-depth in (1) Software Testing Strategies: A 74-subject study, including 32 professional programmers and 42 advanced university students, compared code reading, functional testing, and structural testing in a fractional factorial design. (2) Cleanroom Software Development: Fifteen three-person teams separately built a 1200-line message system to compare Cleanroom software development (in which software is developed completely off-line) with a more traditional approach. (3) Characteristic Software Metric Sets: In the NASA S.E.L. production environment, a study of 85 candidate product and process measures of 852 modules from six (51,000 - 112,000 line) projects yielded a characteristic set of software quality metrics. The approach described for quantitatively evaluating software technologies was effective in a variety of problem domains. With the professionals, code reading detected more software faults and had a higher fault detection rate than did functional or structural testing. With the students, the 3 techniques were not noticeably different in the number of faults detected or in the fault detection rate. Code

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reading detected more interface faults and functional testing detected more control faults than did the other methods. Most developers using the Cleanroom software development approach were able to build systems completely off-line. The Cleanroom teams' products met system requirements more completely and succeeded on more operational test cases than did those developed with traditional approach.

DESCRIPTORS: (U) *COMPUTER PROGRAMS, *ERROR ANALYSIS, *COMPUTER PROGRAMMING, DETECTION, FACTORIAL DESIGN, *FAULTS, INTERFACES, MEASUREMENT, OPERATIONAL EFFECTIVENESS, RATES, STUDENTS, TEAMS(PERSONNEL), TEST AND EVALUATION, TEST METHODS, STRUCTURAL ANALYSIS, PROGRAMMERS

IDENTIFIERS: (U) PER1102P

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 728 9/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB

(U) Joint Services Electronics Program - JSEP. Research in Electronics.

DESCRIPTIVE NOTE: Final rept. 1 Apr 81-J1 Mar 85.

APR 85 171P

PERSONAL AUTHORS: Stoler, William H. ;

CONTRACT NO. F49620-81-C-0070

PROJECT NO. 2305

TASK NO. A8

MONITOR: AFOSR
TR-88-C-78

UNCLASSIFIED REPORT

ABSTRACT: (U) This final technical report summarizes accomplishments and progress of 18 work units (projects) for research performed during the reporting period under the Joint Services Electronics Program by the USC Electronic Sciences Laboratory. Keywords: Electronic materials; Semiconductors; Quantum electronics; Lasers; Communications; Signal processing; Computers; and Controls.

DESCRIPTORS: (U) *RESEARCH MANAGEMENT, COMPUTERS, ELECTRONIC EQUIPMENT, LABORATORIES, LASERS, MATERIALS, QUANTUM ELECTRONICS, SEMICONDUCTORS, SIGNAL PROCESSING, CONTROL SYSTEMS

IDENTIFIERS: (U) PE01102F

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AD-A168 686 9/3

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Continuous-Time Discrete-Order Lattice Filters.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

APR 86 5P

PERSONAL AUTHORS: Lev-Ari, Hanoch ;

CONTRACT NO. N00014-85-K-0812, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0271

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ICASSP Conference, 4p Apr 86.

ABSTRACT: (U) A recursive least squares (RLS) adaptive lattice algorithm for processing of continuous time signals is presented. It has the same structure as the discrete-time RLS lattice, namely a cascade of two input/two output sections with a single delay element per section. However, while the discrete-time scheme involves a fundamental unit of time (i.e., the sampling period of the signal), which determines both the duration of the delay and the rate of gain updating, our scheme involves a delay of arbitrary duration and continuously varying gains. The rate of parameter updating in the continuous time lattice configurations is essentially independent of the bandwidth and center frequency of the processed signal. Consequently, the gain-update module of the proposed algorithm can be implemented with slow devices (as with digital hardware) whereas the signalpath filter must match the frequency characteristics of the processed signal. Keywords: continuous time; discrete order; lattice filters; adaptive lattice filters; signal path filters; Reprints.

DESCRIPTORS: (U) *ADAPTIVE FILTERS, ALGORITHMS, BANDWIDTH, DISCRETE DISTRIBUTION, FREQUENCY, GAIN, INPUT, LATTICE DYNAMICS, LEAST SQUARES METHOD, OUTPUT, PARAMETERS, PATHS, RATES, RECURSIVE FUNCTIONS, REPRINTS.

AD-A168 686

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 896 CONTINUED

AD-A168 891 7/4

SAMPLING, SIGNALS, TIME, TIME SIGNALS, SIGNAL PROCESSING

NORTH TEXAS STATE UNIV DENTON CENTER FOR APPLIED QUANTUM ELECTRONICS

IDENTIFIERS: (U) *Analog filters, PEG1102F

(U) Study of VUV Generation by Coherent Resonant Frequency Mixing in Metal Vapors.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-31 Oct 84,

APR 88 SIP

PERSONAL AUTHORS: Diels, Jean-Claude ;

CONTRACT NO. AFOSR-82-0332

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-88-0303

UNCLASSIFIED REPORT

ABSTRACT: (U) The properties of multiphoton resonances (two, four, or more) are exploited to enhance up frequency conversion rates. Simultaneously, the property of reversibility of coherent interaction is used to minimize the resonant losses (two-photon, four-photon absorption). A source of tunable, near bandwidth limited pulses, of more than a millijoule energy per pulse has been developed. A new scheme of computer controlled data acquisition made it possible to analyze, for the first time, the temporal coherence properties of the amplified pulses (at a rate of 20 pps). The method of interferometric autocorrelation has been applied to the study of multiphoton coherences, leading to the first measurement of the phase angle of the third order susceptibility. Experimental demonstration of coherent enhancement of harmonic generation was made. A conversion efficiency of 1% was achieved for third harmonic generation in lithium vapor, which is the maximum efficiency predicted by the theory for this system.

DESCRIPTORS: (U) *FREQUENCY CONVERSION, *THIRD HARMONIC GENERATION, *VACUUM ULTRAVIOLET RADIATION, *TWO PHOTON ABSORPTION, AUTOCORRELATION, BANDWIDTH, COHERENCE, COMPUTERS, CONTROL, DATA ACQUISITION, HARMONIC GENERATORS, INTERACTIONS, INTERFEROMETRY, LIMITATIONS, LITHIUM, METAL

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVNJ4M

AD-A168 881 CONTINUED

VAPORS, MIXING, OPTIMIZATION, PHOTONS, PULSE AMPLIFIERS,
PULSES, RESONANCE, RESONANT FREQUENCY, RESONANCE
ABSORPTION

IDENTIFIERS: (U) Multiphoton absorption, Frequency
mixing, PE81102F, WJAFOSR2301A1

AD-A168 888 9/3 20/8

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) Picosecond Electronics and Optoelectronics Held at
Incline Village, Nevada on 13-15 March 1985.

DESCRIPTIVE NOTE: Final Rept. 1 Feb 85-4 Feb 86,

FEB 86 138P

PERSONAL AUTHORS: Quinn, Jarvis W. ;

CONTRACT NO. AFOSR-88-0106

PROJECT NO. 2308

TASK NO. 82

MONITOR: AFOSR
TR-88-0187

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of the meeting was to provide
a forum for people working in the different areas of
ultrafast electronics and optoelectronics and sharing a
common interest in the understanding and improvements of
the electronic properties of semiconductors and
superconductors, the physics of ultrafast devices, their
applications and methods of measurements. (Author)

DESCRIPTORS: (U) *ELECTROOPTICS, *SEMICONDUCTOR LASERS,
*SYMPOSIA, *QUANTUM ELECTRONICS, *PULSED LASERS,
ELECTRONIC EQUIPMENT, ELECTRONICS, HIGH RATE,
SEMICONDUCTORS, SUPERCONDUCTORS, GALLIUM ARSENIDES,
*PHOTOELECTRIC EMISSION, INDIUM PHOSPHIDES, TRANSPORT
PROPERTIES, CHARGE CARRIERS, OPTICAL CIRCUITS, INTEGRATED
CIRCUITS, MODE LOCKED LASERS

IDENTIFIERS: (U) Picosecond time, Aluminum gallium
arsenide lasers, WJNR373115, PE81102F, WJAFOSR230882

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AD-A168 885

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A108 871 12/1

AD-A108 848 20/2 7/4

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

CARNEGIE-MELLON UNIV PITTSBURGH PA MELLON INST OF SCIENCE

(U) DFR (Decreasing Failure Rate) Property of First Passage Times and Its Preservation under Geometric Compounding

(U) Vapor Growth and Epitaxy/American Crystal Growth 1984: Proceedings of the Combined Meeting ICVGE/ACOG-8 Held in Atlantic City, NJ on 18-20 July 1984.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Final rept. 1 Jul 84-30 Jun 85.

JAN 86 20P

FEB 86 633P

PERSONAL AUTHORS: Shanthikumar, J. G. ;

PERSONAL AUTHORS: Schieber, M. ; Kaldia, E. ; Shaw, D. W. ; Stringfellow, G. B. ; Van Den Berg, L. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

CONTRACT NO. AFOSR-84-0183

TASK NO. A8

PROJECT NO. 2308

MONITOR: AFOSR

TR-88-0278

MONITOR: AFOSR

TR-88-0292

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) It is shown that if the transition kernel of a discrete time Markov chain with state space $(0, 1, \dots)$ is totally positive of order two (TP2), the first passage time from state 1 to state 0 has decreasing failure rate (DFR). This result is used to show that (i) the sum of a geometric random variable (i.e., geometric compound) of i.i.d. DFR random variables is DFR and (ii) the number of customers served during a busy period in an M/G/1 queue with increasing failure rate service times is DFR. Recent results of Szekli (1988) and the closure property of i.i.d. DFR random variables under geometric compounding are combined to show that the stationary waiting time in a GI/G/1 (M/G/1) queue with DFR (increasing mean residual service times is DFR. We also provide sufficient conditions on the inter-renewal times under which the renewal function is concave. These results shed some light on a conjecture of Brown (1981). (Author)

DESCRIPTORS: (U) *QUEUEING THEORY, DISCRETE DISTRIBUTION, FAILURE, GEOMETRY, MARKOV PROCESSES, RANDOM VARIABLES, RATES, TIME, TRANSITIONS, FUNCTIONS(MATHEMATICS), KERNEL FUNCTIONS

IDENTIFIERS: (U) WJAFDSR2304A5, PER1102F

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AD-A108 848

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Availability: Elsevier Science Publishing Co., 52 Vanderbilt Avenue, New York, NY 10017, HC \$248.00. (No copies furnished by DTIC/NTIS).

ABSTRACT: (U) The American Association for Crystal Growth (AACG) held its Sixth American Conference on Crystal Growth (AACG-6) together with the Sixth International Conference on Vapor Growth and Epitaxy (ICVGE-6) on July 18-20, 1984. Data presented at the Conference pertained to: Heat and mass transfer; Mechanisms of growth; Liquid phase epitaxy; Molecular beam epitaxy; Vapor phase epitaxy and chemical vapor deposition; Epitaxy with organometallic transport; Growth of large bulk crystals from vapor; Photovoltaics and solar cells; Heterostructures and characterization; Defects and characterization; Melt growth of oxides; Melt growth of semiconductors; Flux growth; Solution and hydrothermal growth; Industrial crystallization; Theory and Simulations; III-V compounds; Silicon and silicon compounds; II-VI and IV-VI compounds (for IR and X-ray detectors); Solar cells; Multilayer structures; Oxides; Alloys and Miscellaneous; and Characterization.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 648 CONTINUED

AD-A168 642 8/8 8/3

BROWN UNIV (ROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

DESCRIPTORS: (U) *INDUSTRIAL RESEARCH, *EPITAXIAL GROWTH, *SYNTHESIS, *CRYSTAL GROWTH, ALLOYS, CHEMICAL REACTIONS, VAPOR DEPOSIT, *CRYSTALS, GRAVITY, GROUP III COMPOUNDS, GROUP V COMPOUNDS, INTERNATIONAL, LIQUID PHASES, FLUX(RATE), *STRUCTURES, CRYSTALLIZATION, BULK MATERIALS, MASS TRANSFER, BELTS, LAYERS, STRUCTURES, OXIDES, SILICON, SOLAR CELLS, *YETTER PHASES, MOLECULAR BEAMS, ORGANOMETALLIC COMPOUNDS, TRANSPORT, PHOTOVOLTAIC EFFECT, SILICON COMPOUNDS, VAPORS, DETECTORS, HEAT TRANSFER, X RAY APPARATUS

IDENTIFIERS: (U) PE61102F

(U) Modeling Insect Dispersal and Estimating Parameters When Mark-Release Techniques May Cause Initial Disturbances.

88 20P

PERSONAL AUTHORS: Banks, H. T.; Kareliva, P. M.; Lamm, P. K.;

CONTRACT NO. AFOSR-81-0198, NS7-MCS82-05335

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-88-0281

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Mathematical Biology, V22 p258-277 1988.

ABSTRACT: (U) We consider the problem of quantitatively modeling movements of marked flea beetles in cultivated arrays of the cole crop, collards (*Brassica oleracea*). Methods for the estimation of temporally and spatially dependent parameters in general dispersal models are outlined and a summary of our findings using these methods with flea beetle data is given.

DESCRIPTORS: (U) *VEGETATION, *ECOLOGY, *COLEOPTERA, MOTION, ESTIMATES, PARAMETERS, DISPERSING, INSECTS, MODELS, SIPHONAPTERA, REPRINTS

IDENTIFIERS: (U) PE61102F

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 041 8/4

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Adaptive Beamforming for Coherent Signals and Interference

DESCRIPTIVE NOTE: Rept. for 1984-1985.

JUN 88 11P

PERSONAL AUTHORS: Shan, Tie-Jun; Kallath, Thomas ;

CONTRACT NO. DAAG19-81-K-0067, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86 0288

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, VASSP-33 n3 p627-638 Jun 85.

ABSTRACT: (U) In this paper we introduce a new adaptive array beamformer able to work well even when the desired signal and the interference are coherent. The present adaptive beamformers fail to operate in these cases. The results of simulations support the theoretical predictions. Keywords include: Adaptive, Beam forming signals, Sensor elements, Receiver noise, Spatial dither, and single snapshot.

DESCRIPTORS: (U) *RECEIVERS, *BEAM FORMING, *ARRAYS, *NOISE, *ADAPTIVE SYSTEMS, ALGORITHMS, SIGNAL PROCESSING, INTERFERENCE, ENERGY, COHERENCE, LINEAR SYSTEMS, DISTORTION, JAMMING, REPRINTS

IDENTIFIERS: (U) Spatial dither, Spectral estimation, Snapshots, Weighting vectors, Frost beamformers, PEG1102F

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AD-A168 027 8/3

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Mesh-Connected Processor Arrays for the Transitive Closure Problem.

DEC 88 7P

PERSONAL AUTHORS: Rao, Sateesh K.; Citron, Todd ; Kallath, Thomas ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0284

UNCLASSIFIED REPORT

ABSTRACT: (U) The main purpose in this paper is to lay a theoretical foundation for the design of mesh connected processor arrays for the transitive closure problem. Using a simple path algebraic formulation of the problem and observing its similarity to certain well known smoothing problems that occur in digital signal processing, we show how to draw upon existing techniques from the signal processing literature to derive regular iterative algorithms for determining the transitive closure of the graph. The regular iterative algorithms that are derived using this considerations, are then analyzed and synthesized on mesh connected processor arrays. Among the vast number of mesh connected processor arrays that can be designed using this unified approach, the systolic arrays reported in the literature for this problem are shown to be special cases. Keywords: Mesh connected processor arrays; Transitive closure problems; Systolic architectures; Matrix multiplication; Array; and Iteration algorithms.

DESCRIPTORS: (U) *GRAPHS, *ARRAYS, ALGORITHMS, CLOSURES, DIGITAL SYSTEMS, ITERATIONS, SIGNAL PROCESSING, MESH

IDENTIFIERS: (U) Systolic arrays

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A168 824 20/8

POLYTECHNIC INST OF NEW YORK FARMINGDALE LONG ISLAND
GRADUATE CENTER

(U) Millimeter Wave Generation by Relativistic Electron
Beams.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 85.

NOV 88 47P

PERSONAL AUTHORS: Kuo, Spencer S.; Cheo, Bernard R.; Tjong,
K. K.; Wang, M. H.;

REPORT NO. POLY-85-011

CONTRACT NO. AFOSR-83-0001

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-88-0316

UNCLASSIFIED REPORT

ABSTRACT: (U) The classical technique of transformation and characteristics is employed to analyze the problem of strong turbulence in unmagnetized plasmas. The effect of resonance broadening and perturbation expansion are treated simultaneously without time securities. The renormalization procedure is used in the transformed Vlasov equation to analyze the turbulence and to derive explicitly a diffusion equation. Analyses are extended to inhomogeneous plasma and the relationship between the transformation and ponderomotive force is obtained.

DESCRIPTORS: (U) *TURBULENCE, *PLASMAS/PHYSICS), EQUATIONS, ELECTRON BEAMS, RELATIVITY THEORY, MAGNETIZATION, DIFFUSION, MILLIMETER WAVES, WAVE PROPAGATION, PERTURBATIONS, PARTIAL DIFFERENTIAL EQUATIONS, TRANSFORMATIONS(MATHEMATICS), MASERS, HEATING, CYCLOTRON RESONANCE, GYROTRONS

IDENTIFIERS: (U) Vlasov equations, Plasma instabilities, Vlasov equations, PEB1102F, WJAFOSR2301A8

AD-A168 824

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AD-A168 823 12/1

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Immittance-Domain Levinson Algorithms.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

APR 86 BP

PERSONAL AUTHORS: Bistri'z, Y.; Lev-Ari, H.; Kallath, T.;

CONTRACT NO. AFOSR-83-0328

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-88-0273

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ICASSP Conference, Apr 88.

ABSTRACT: (U) Several computationally extra-efficient versions the Levinson algorithms are presented. The new versions require half the number of multiplications and the same number of additions as the conventional form of the Levinson algorithm. The saving is achieved by using three- (rather than two) term recursions and propagating them in an Impedance/Admittance domain rather than the conventional scattering domain. Our result apply both to Toeplitz and to close to Toeplitz systems. Moreover they provide a general method for reducing computational requirements in various recursive algorithms, e.g. adaptive least-square lattice algorithms. (Author)

DESCRIPTORS: (U) *ALGORITHMS, *RECURSIVE FUNCTIONS, COMPUTATIONS, REQUIREMENTS, SCATTERING, REPRINTS

IDENTIFIERS: (U) Levinson algorithm, PEB1102F, WJAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 822 CONTINUED

AD-A168 822 22/2 12/1

STATE UNIV OF NEW YORK AT BUFFALO AMHERST DEPT OF
MECHANICAL AND AEROSPACE ENGINEERING

IDENTIFIERS: (U) PFO1102F WJAFOSR2304A1

(U) Qualitative Results for Distributed Systems with
Discrete and Stiffness with Application to Control.

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-30 Jun 85.

AUG 85 218P

PERSONAL AUTHORS: Inman, Daniel J. ;

CONTRACT NO. AFOSR-82-0242

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-86-0286

UNCLASSIFIED R/ ORT

ABSTRACT: (U) Distributed parameter models of large flexible space structures subject to various control techniques have been studied. The main thrust has been to develop qualitative results which are independent of truncation of discretization approaches by treating the fully distributed model. Emphasis has been on controlling the transient response of non-conservative linear partial differential equation models of such structures subject to a few point actuators. Inequalities have been developed between the stiffness and damping operators which when satisfied guarantee that the response of a selfadjoint system will be uniformly exponentially stable. In addition, it has been shown that the inequalities insure that finite dimensional versions of the control problem converge to an optimal control of the fully distributed system subject to compact feedback as the number of modes in the finite model increases. The inequality developed constitutes a generalization of the concept of overdamping normally used with single degree of freedom systems and provides a physical interpretation of the result.

DESCRIPTORS: (U) *SPACECRAFT, *FLEXIBLE STRUCTURES,
*MATHEMATICAL MODELS, CONTROL, DAMPING, DISTRIBUTION,
PARAMETERS, STIFFNESS

AD-A168 822

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 821 9/3

AJ-A168 818 7/8

TEXAS UNIV AT AUSTIN, DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) The Structure of Nonlinear Control Systems Possessing Symmetries.

(U) Topical Meeting on Microphysics of Surfaces, Beams, and Adsorbates Held at Santa Fe, New Mexico on 4-6 February 1988.

MAR 88 12P

DESCRIPTIVE NOTE: Final technical digest.

PERSONAL AUTHORS: Grizzle, Jessy W.; Marcus, Steven I.;

DEC 85 123P

CONTRACT NO. AFOSR-84-0089

PERSONAL AUTHORS: Quinn, Marcus W.

PROJECT NO. 2304

CONTRACT NO. AFOSR-88-0018

TASK NO. A5

PROJECT NO. 2303

MONITOR: AFOSR

TASK NO. A2

TR 88-0282

MONITOR: AFOSR

TR-88-0309

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. IEEE Transactions on Automatic Control, VAC-30 n3 p248-268 Mar 85.

UNCLASSIFIED REPORT

ABSTRACT: (U) A concept of symmetry is defined for general nonlinear control systems. It is shown, under various technical conditions, that nonlinear control systems with symmetries admit local and/or global decompositions in terms of lower dimensional subsystems and feedback loops. The structure of the individual subsystems is dependent on the structure of the symmetry group; for example, if the symmetry group is Abelian, one of the subsystems is a quadrature. An additional feature of the decomposition is that the state-space dimensions of the subsystems sum to the state-space dimension of the original system. (Reprints)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *NONLINEAR SYSTEMS, DECOMPOSITION, FEEDBACK, GLOBAL, LOCALS, REPRINTS, SIZES(DIMENSIONS), SYMMETRY, SYSTEMS ENGINEERING

IDENTIFIERS: (U) PB81102F, WJAFOSR2304A5

AD-A168 821

AD-A168 818

UNCLASSIFIED

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ABSTRACT: (U) The Topical Meeting on Microphysics of Surfaces, Beams, and Adsorbates was organized within the interdisciplinary area of molecule/surface interactions induced, or studied, by laser and ion beam techniques. Especially emphasized was the molecular physics and electro magnetism of beam activated chemical reactions for applications in fabrication of semiconductor devices, in photocatalysis, and in optical recording. Emphasis was on the laser spectroscopy of molecular collision and reaction processes on surfaces, new sensitive or high resolution spectroscopies for studies of adsorbates, and optical methods applied to surface characterization.

DESCRIPTORS: (U) *PHOTOACTIVATION ANALYSIS, *PHOTOCHEMICAL REACTIONS, *LASER BEAMS, *PHOTOCHEMICAL REACTIONS, *ADSORBATES, LASER TARGET INTERACTIONS, SYMPOSIA, PARTICLE COLLISIONS, MOLECULAR BEAMS, SURFACE CHEMISTRY, ETCHING, ION BOMBARDMENT, LASER INDUCED FLUORESCENCE, RAMAN SPECTRA, EPITAXIAL GROWTH, VAPOR DEPOSITION, HIGH RESOLUTION, SPECTROSCOPY, LASERS, SURFACES, MOLECULAR STRUCTURE, RESOLUTION, CATALYSIS, FABRICATION, SEMICONDUCTOR DEVICES, ION BEAMS, INTERACTIONS, OPTICAL PROPERTIES, RECORDING SYSTEMS

IDENTIFIERS: (U) Photoacoustic spectroscopy, Raman

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 618 CONTINUED

AD-A168 617 12/1

spectroscopy, PE81102F, WJAFOSR2303A2

INDIANA UNIV AT BLOOMINGTON DEPT OF COMPUTER SCIENCE

(U) Probabilistic Analysis of Algorithms for NP-Complete Problems.

DESCRIPTIVE NOTE: Annual scientific rept. (Final) 30 Sep 84-28 Sep 85.

DEC 85 8P

PERSONAL AUTHORS: Franco, John ;

CONTRACT NO. AFOSR-84-0372

PROJECT NO. 230A

TASK NO. A2

MONITOR: AFOSR
TR-88-0310

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this research is to develop and analyze algorithms which can, in some practical sense, solve certain NP-complete problems efficiently. By solve we mean determine whether a solution to a given instance of an NP-complete problem exists where, for the problems we have considered, a solution is an assignment of values to a list of variables which cause some predicate to be true. We do not consider actually finding solutions when they exist since doing so adds unnecessary complexity to the statement of the algorithm: the algorithms we consider can all be modified to find solutions without significantly altering performance. NP-complete problems are found in Cryptology, Operations Research, Artificial Intelligence, Computer System Design and many other areas. There is no known algorithm for an NP-complete problem which runs in time bounded by a polynomial on the length of the input (polynomial time) in the worst case nor is one likely to be found. We seek algorithms which solve nearly every instance of specific NP-complete problems in polynomial time.

DESCRIPTORS: (U) *ALGORITHMS, *PROBABILITY, ARTIFICIAL INTELLIGENCE, OPERATIONS RESEARCH, POLYNOMIALS, SOLUTIONS(GENERAL), TIME, VARIABLES, PROBLEM SOLVING

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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AD-A168 815 12/1

IDENTIFIERS: (U) NP complete problems. PEB1102F,
WUAFOSR2304A2

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J

(U) Analysis and Regulation of Nonlinear and Generalized
Linear Systems.

DESCRIPTIVE NOTE: Final technical rept. 15 Jun 80-14 Jul
85.

SEP 85 12P

PERSONAL AUTHORS: Sontag, Eduardo D. ;

CONTRACT NO. AFOSR-80-0198

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-86-0285

UNCLASSIFIED REPORT

ABSTRACT: (U) Applications are described of various
mathematical techniques to problems of regulation and
control of nonlinear sampled-data systems and of systems
over rings, including delay-differential systems and
families of linear systems. An extensive bibliography of
papers published is included. Keywords: Mathematical
models. (Author)

DESCRIPTORS: (U) *LINEAR SYSTEMS, *NONLINEAR SYSTEMS,
MATHEMATICAL ANALYSIS, MATHEMATICAL MODELS, RINGS,
SAMPLING, NONLINEAR ANALYSIS

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304

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CALIFORNIA UNIV IRVINE DEPT OF PHARMACOLOGY

(U) Neuronal Mechanisms of Intelligence

stimulation for measuring reward). Keywords: Neuronal conditioning; Positive reinforcement; Learning; and Adaptive networks.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Sep 84-31 Aug 85.

DESCRIPTORS: (U) *BRAIN, *DRUGS, *NERVE CELLS, *INTELLIGENCE, *CONDITIONING(LEARNING), ADAPTIVE SYSTEMS, ANATOMY, CELLS, DOPAMINE, ELECTRIC CURRENT, FIRING RATES, LEARNING, NETWORKS, PHARMACOLOGY, SITES, NERVE TRANSMISSION, STIMULATION(PHYSIOLOGY), HIPPOCAMPUS

MAR 86 14P

PERSONAL AUTHORS: Stein, Larry ; Belluzzi, James D. ;

IDENTIFIERS: (U) PER1102F, WJAFOSR2312A1

CONTRACT NO. AFOSR-84-0328

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-86-002287

UNCLASSIFIED REPORT

ABSTRACT: (U) The underlying premise of this research is that the neuron itself is the functional unit in the brain for positive reinforcement. Our early studies demonstrated for the first time that the firing rate of a brain cell could be increased by local applications of reinforcing transmitters of drugs. Our current work has two aims: 1) to examine the detailed anatomical and pharmacological properties of such cellular operant conditioning, and 2) to compare these properties with those of behavioral operant conditioning in order to determine important similarities and differences. We have studied cellular operant conditioning in whole-brain and brain-slice experiments. In whole brain, we have attempted to identify those cells most susceptible to reinforcement using electrical stimulation of rewarding brain sites as reinforcement. In brain slice experiments, we have found that 1) the reinforcing action of dopamine is likely mediated at D2 dopamine receptors, and 2) applied electrical stimulation is possible using locally cellular operant conditioning. At the behavioral level we have continued our pharmacological characterization of reinforcement receptors in self-stimulation of hippocampus and nucleus accumbens (primary sites of the brain slice experiments), and characterization of reinforcement receptors in place preference studies (an alternative method to self-

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AD-A168 613 6/10 6/16

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OREGON UNIV EUGENE

LOW FREQUENCIES, LOW FREQUENCY, MARKERS, ORGANIZATIONS,
SPATIAL DISTRIBUTION, SPATIAL FILTERING, VISION, COLORS,
CONTRAST

(U) Visual Representations Subserving Texture Perception.

DESCRIPTIVE NOTE: Final rept. 1 Apr 83-31 Aug 85.

IDENTIFIERS: (U) PEG1102F, WUAFOSR2313AB

JAN 86 108P

PERSONAL AUTHORS: Beck, Jacob ; Stevens, Kent A. ;

CONTRACT NO. F49620-83-C-0083

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-86 0290

UNCLASSIFIED REPORT

ABSTRACT: (U) We have conducted research on the role of spatial filtering, features, and grouping in texture segregation. Our experiments indicate the interplay of two different processes. One process involves the differential excitation of elongated receptive fields. Texture segregation is a function of energy differences (contrast and size) that are largely extracted from the lower spatial frequencies. The second process involves local processes of linking between localized features. Linking of contours, for example, is a function of contour smoothness, collinearity, orientation, etc. These effects cannot be explained in terms of low frequency differences. Studies of the linking of discrete textures have provided convergent evidence for explicit place markers and the role of similarity of attributes such as color and contrast in establishing these groupings. We have also examined the role of pairwise linkings, or virtual lines for imposing global organization on the localized intensity changes. Also, at the level of contour representation within texture, we have shown the role of the concave cusp, a localized geometric feature, in determining figure-ground assignment in texture. Keywords: Vision; Texture perception; and Texture segmentation.

DESCRIPTORS: (U) *TEXTURE, *VISUAL PERCEPTION, CONCAVE
BODIES, CONTOURS, CONVERGENCE, ENERGY, EXCITATION, GLOBAL,

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MASSACHUSETTS UNIV AMHERST DEPT OF POLYMER SCIENCE AND
ENGINEERING

(U) Spectroscopic Analysis of Poly(p-phenylene
benzobisthiazole) Films.

RESIDUALS, WATER, HEAT TREATMENT, PROCESSING, AXES,
CHAINS, CHEMICAL REACTIONS, ENVIRONMENTS, RESIDUALS,
MATRIX MATERIALS, FILMS, INFRARED RADIATION, POLARIZATION,
REFLECTION, MOLECULAR STRUCTURE, CROSSLINKING(CHEMISTRY),
REFRACTION, SPECTROSCOPY, MOLECULES, REPRINTS

88 12P

IDENTIFIERS: (U) Thiazole/Poly(phenylene Benzobis,
PE61102P, WUAF0SR2303A3

PERSONAL AUTHORS: Chang, Chih (Hsu, S. L.);

CONTRACT NO. F33616-78-C-8176, AFOSR-85-0276

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR 86-0280

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Polymer Science:
Polymer Physics Edition, v23 p2307-2317 1985.

ABSTRACT: (U) Infrared spectroscopy has been used to
determine the relative amount, location, and orientation
of residual water and acid molecules in poly(p-phenylene
benzobisthiazole) films. By analyzing the relative
absorbance of reflected polarized infrared radiation from
highly oriented films, the indices of refraction parallel
and perpendicular to the chain axis were also obtained.
The presence of residual acid and water in the
postprocessing sample is of obvious interest, not only
because it influences the perfection of chain packing and
interacts with the matrix material used for composites,
but because it may also initiate unexpected chemical
reactions with the polymer during postprocessing thermal
treatment, consequently leading to crosslinking or
degradation. The principal aim of this spectroscopic
analysis is to measure the amount and the environment of
residual acid and water molecules in these processed
samples. Infrared spectroscopy provides a convenient and
effective method to determine the concentration of acid
or water in a sample.

DESCRIPTORS: (U) *INFRARED SPECTROSCOPY, *POLYMERIC
FILMS, *POLYPHENYLENES, *THIAZOLES, ACIDS, MOLECULES,
CHAINS, PACKAGING, DEGRADATION, ORIENTATION(DIRECTION),

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 882 7/4 7/5

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) State-Resolved Reaction Dynamics.

DESCRIPTIVE NOTE: Final rept. 1 Nov 84-31 Oct 85.

DEC 85 8P

PERSONAL AUTHORS: Zare, Richard N. ;

CONTRACT NO. F4820-85-C-0021

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR 86-0307

UNCLASSIFIED REPORT

ABSTRACT: (U) During the past three years major progress has been made in three areas: (1) the study of the simplest of all neutral bimolecular reactions $H + D_2$ yields $HD + D$ using one laser to generate fast H atoms in the photolysis of HI in an $HI + D_2$ mixture and a second laser to detect the HD product in a quantum state specific manner by resonance-enhanced multiphoton ionization of HD via the E, F, I sigma $g +$ state; (2) The determination of the distribution of impact parameters responsible for the formation of $BeI(v=8)$ product in the beam-gas reaction $Be + HI$. This required a full rotational analysis of the BeI sigma X sigma $g +$ and sq C pi states; (3) the commencement of studies on ion-molecule reactions in which the reagent ion's vibrational and translational energy is controlled and varied in a systematic manner.

DESCRIPTORS: (U) *REACTION KINETICS, *HYDROGEN IODIDE, *MOLECULAR STATES, *PHOTOLYSIS, DEUTERIUM, *PHOTOIONIZATION, VIBRATION, ROTATION, LASERS, QUANTUM THEORY, CHEMICAL REACTIONS, IONS, MOLECULES, IMPACT, PARAMETERS

IDENTIFIERS: (U) Ion molecule interactions, PE81102F, WUAFOSR2303B1

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AD-A168 876 11/4

ID440 UNIV MOSCOW DEPT OF MECHANICAL ENGINEERING

(U) Improvement and Optimization of Internal Damping in Fiber Reinforced Composite Materials.

DESCRIPTIVE NOTE: Final rept. Jun 83-Nov 85.

MAR 86 225P

PERSONAL AUTHORS: Gibson, R. F. ; Suarez, S. A. ;

CONTRACT NO. AFOSR-83-0186

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR 86-0330

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research was to study the effects of such parameters as fiber aspect ratio, fiber orientation and fiber/matrix properties on damping in fiber reinforced polymer composites. These objectives were to be met by using both experimental and analytical approaches. The development of improved techniques for fabrication and testing of specimens and the development of relatively simple design equations for prediction of damping were desirable goals which were also met. Two new computer-aided testing techniques based on the impulse frequency response approach were developed. Specimens of graphite/epoxy, boron/epoxy and Kevlar aramid/epoxy were fabricated by using an autoclave-style press cure which was developed specifically for this program. Although a number of parameters were studied, the emphasis was on the influence of fiber length, fiber orientation and fiber material on damping of polymer composites. The experimental results show that, as predicted, very low fiber aspect ratios are required to produce significant improvements in damping. Of the three fiber types tested, the Kevlar aramid fiber composite was found to have much better damping than graphite or boron fiber composites. Measurements and predictions also indicate that the control of fiber orientation in a continuous fiber reinforced laminate may be a better approach to the improvement of damping than the control

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SEARCH CONTROL NO. EVN34M

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of fiber aspect ratio.

DESCRIPTORS (U) *DAMPING, *FIBER REINFORCED COMPOSITES,
*FIBERS *FIBER REINFORCEMENT,
ORIENTATE *DIRECTION), CONTROL, ASPECT RATIO, MATERIALS,
COMPOSITE MATERIALS, POLYMERS, LENGTH, PREDICTIONS,
INTERNAL EQUATIONS, GRAPHITE, PARAMETERS, APPROACH,
RESPONSE

IDENTIFIERS (U) PEG1102F

AD-A168 568 5/8 5/10 6/2 12/1

PERCEPTRONICS INC WOODLAND HILLS CA

(U) Operator Alertness/Workload Assessment Using
Stochastic Model-Based Analysis of Myoelectric Signals.

DESCRIPTIVE NOTE: Interim rept. Apr 83-Oct 85 on Phase 2.

NOV 85 83P

PERSONAL AUTHORS: Madni, Azad ; Conaway, Carla ; Otsubu,
Shirley ; Chu, Yee-Yuen ; Purcell, Denis ;

REPORT NO. PIR-1128-88-4

CONTRACT NO. F49620-83-C-0001

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-88-0317

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the activities in the second phase of a three-year program of research and development directed toward the analysis and evaluation of myoelectric signals (MES) as indicators of operator alertness, and potentially workload in aircraft piloting tasks. The purpose of the study is to investigate the efficiency of stochastic models such as autoregressive (AR), autoregressive-moving-average (ARMA) and autoregressive integrated moving average (ARIMA) models in characterizing the MES under different levels of task imposed burden. The specific objectives of this effort are: (1) to develop/adapt state-of-the-art stochastic models for characterizing myoelectric signal patterns; (2) to investigate under controlled experimental conditions if meaningful repeatable quantitative relationships can be identified between MES patterns and operator loading; (3) to experimentally identify muscle sites that provide reliable MES signatures; (4) to develop methods and procedures for tuning the models and possibly filtering out pattern variations due to variables in electrode locations and individual biases; and (5) To develop guidelines for automatically assessing operator alertness level from the MES temporal signature in piloting tasks.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34N

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(Author)

PERCEPTRONICS INC WOODLAND HILLS CA

DESCRIPTORS: (U) *OPERATORS(PERSONNEL), *WORKLOAD,
*PERFORMANCE(HUMAN), *PILOTS, *ELECTROMYOGRAPHY,
*MONITORING, *ATTENTION, EFFICIENCY, ELECTRODES,
INDICATORS, MATHEMATICAL MODELS, MUSCLES,
POSITION(LOCATION), QUANTITATIVE ANALYSIS,
REPRODUCIBILITY, SITES, STOCHASTIC PROCESSES, TUNING,
WORK MEASUREMENT, REGRESSION ANALYSIS, PATTERN
RECOGNITION, SIGNAL PROCESSING

(U) Operator Alertness/Workload Assessment Using
Stochastic Model-Based Analysis of Myoelectric Signals.

DESCRIPTIVE NOTE: Final rept. Apr 84-Oct 82.

NOV 88 130P

PERSONAL AUTHORS: Madni, Azad ; Conaway, Carla ; Otsu, Shiro ; Chu, Yee-Yuen ;

REPORT NO. PFTN-1128-88-11

CONTRACT NO. F49620-83-C-0001

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-88-0325

UNCLASSIFIED REPORT

IDENTIFIERS: (U) Alertness, MES(Myoelectric Signals),
ARMA(Autoregressive Moving Average), ARIMA(Autoregressive
Integrated Moving Average), PE81102F, MUAFDSR2313A4

ABSTRACT: (U) This report summarizes the research conducted in the second phase of this three-year research and development program directed toward the analysis and evaluation of myoelectric signals (MES) as indicators of operator alertness and piloting workload. The purpose of the study was to investigate the efficiency of stochastic models such as autoregressive (AR), autoregressive-moving-average (ARMA), and autoregressive integrated moving average (ARIMA) models in characterizing the MES under different levels of task-imposed burden. The implications from this three-year research program are two-fold. Surface myoelectric activity is not a reliable measure of operator alertness. During Phase I, the first autoregressive coefficient of the ARIMA model revealed a significant correlation with task difficulty level. During Phase III, the pi weights did not show the same trend. Intramuscular electrodes, on the other hand, that do pick up more reliable signatures have obvious drawbacks. Post hoc analysis of the experimental data revealed that the total number of experimental subjects which were constrained by program scope and size were inadequate in terms of producing a statistically significant difference in perceived stress between the

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single and dual-task groups.

DESCRIPTORS: (U) *OPERATORS(PERSONNEL), *PILOTS,
*WORKLOAD, *PERFORMANCE(HUMAN), *ELECTROMYOGRAPHY,
*MONITORING, ATTENTION, COEFFICIENTS, EFFICIENCY,
ELECTRODES, INDICATORS, MATHEMATICAL MODELS, MUSCLES,
REGRESSION ANALYSIS, PATTERN RECOGNITION, RELIABILITY,
SIGNATURES, STASTIC PROCESSES, WORK MEASUREMENT,
SIGNAL PROCESSING

IDENTIFIERS: (U) Alertness, MES(Myoelectric Signals),
Arma(AutoRegressive Moving Average), ARIMA(AutoRegressive
Integrated Moving Average), PE81102F, WJAFOSR2313A4

AD-A168 561 9/3

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS
AND ASTRONAUTICS

(U) Approximate Evaluation of Reliability and Availability
Via Perturbation Analysis.

DESCRIPTIVE NOTE: Annual progress rept. 1 Jun 84-31 May
88.

SEP 88 48P

PERSONAL AUTHOR: Walker, Bruce K.; Chu, Siu-Kueng; Wareley,
Norman M.;

CONTRACT NO. AFOSR-84-0160

PROJECT NO. 2304

TASK NO. K3

MONITOR: AFOSR/
TR-83-0314

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) Progress is described on a project whose
goal is the development of practical tools for evaluating
the reliability and availability of fault-tolerant
control or sensor systems. The approach relies on the
generation of a Markovian model for the behavior of the
system in terms of failures and Redundancy Management
decisions. The project entails the investigation of
approximate techniques for deriving results from these
models. The basic idea is that the time-behavior of the
model decomposes into two time scales where the results
of interest occur in time frames intermediate to the two
time scales. By modifying previous theory, an approximate
evaluation scheme is developed and shown to be valid for
a number of example cases. Ongoing work is also described.
(Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *CONTROL
SYSTEMS, *SYSTEMS ANALYSIS, DECISION MAKING, DETECTORS,
MANAGEMENT, MARKOV PROCESSES, PERTURBATIONS, REDUNDANCY,
RELIABILITY, SCALE, TEST AND EVALUATION, TIME, TIME
INTERVALS, MATHEMATICAL MODELS

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AD-A188 548 7/1

IDENTIFIERS: (U) PE61102F, WJAFOSR2304K3

VANDERBILT UNIV NASHVILLE TN DEPT OF CHEMISTRY

(U) Potentials for Weakly Bound States in I₂ from Diffuse Spectra and Predissociation Data.

MAY 85 6P

PERSONAL AUTHORS: Tellinghuisen, Joel ;

CONTRACT NO. AFOSR-83-0110

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-86-0214

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v82
n9 p4012-4018, 1 May 85.

ABSTRACT: (U) Potential curves are derived for the 2431
1 Pi sub u and 2341 1 sub g 3 Pi states of I₂ using
existing data from several sources. Compared with
previous estimates, the new potentials are thought to be
valid over a wider range of internuclear distance,
spanning the shallow bound wells at large R (>4A) and the
repulsive regions where they cross the well-known B(0+) sub u 3 Pi state at small R (<3.3A). Seven of the ten
fund's case (c) molecular states which correlate with
ground-state I atoms are now known experimentally,
including three which cross the B state. The role of
these states in the collisional quenching of B and in the
geminate recombination of I atoms is considered. Keywords:
Diffuse spectra predissociation; Internuclear collisional
quenching; Reprints; Iodine.

DESCRIPTORS: (U) *QUENCHING, *IODINE, *RECOMBINATION
REACTIONS, *IONS, DIFFUSION, GROUND STATE, MOLECULAR
STATES, REPRINTS, COLLISIONS, PHOTODISSOCIATION, EMISSION
SPECTRA, ELECTRONIC STATES

IDENTIFIERS: (U) PE61102F, WJAFOSR2303B1

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AD-A188 844 12/1

AD-A188 833 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Estimating Jointly System and Component Reliabilities Using a Mutual Censorship Approach.

(U) Conditional Scores and Optimal Scores for Generalized Linear Measurement-Error Models.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Technical rept. Aug 88-Aug 88.

FEB 88 38P

OCT 88 28P

PERSONAL AUTHORS: Doss, Henri ; Freltag, Steven ; Proschan, Frank ;

PERSONAL AUTHORS: Stefanski, Leonard A. ; Carroll, Raymond J.

REPORT NO FSU-STATISTICS-M717, TR-88-188-AFOSR

REPORT NO. MIMO-SER-1888

CONTRACT NO F49620-88-C-0007

CONTRACT NO. F49620-82-C-0008

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A5

TASK NO. A5

MONITOR: AFOSR TR-88-0334

MONITOR: AFOSR TR-88-0318

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Let F denote the life distribution of a coherent structure of independent components. Suppose that we have a sample of independent systems, each having the structure phi . Each system is continuously observed until it fails. For every component in each system, either a failure time or a censoring time is recorded. A failure time is recorded if the component fails before or at the time of system failure; otherwise a censoring time is recorded. We introduce a method for finding estimates for $F(t)$ quantiles, and other functionals of F , based on the censorship of the component lives by system failure. We present limit theorems that enable the construction of confidence intervals for large samples. (Author)

DESCRIPTORS (U) *ESTIMATES, *STATISTICAL ANALYSIS, CENSORSHIP COHERENCE, CONFIDENCE LIMITS, FAILURE, INTERVALS, SAMPLING, TIME

IDENTIFIERS (U) Kaplan Meier estimator, PE81102F, WJAFOSR2304A5

AD-A188 844

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AD-A188 833

ABSTRACT: (U) This paper studies estimation of the parameters of generalized linear models in canonical form when the explanatory vector is measured with independent normal error. For the functional case, i.e., when the explanatory vectors are fixed constants, unbiased score functions are obtained by conditioning on certain sufficient statistics. This work generalizes results obtained for logistic regression. In the case that the explanatory vectors are independent and identically distributed with unknown distribution, efficient score functions are obtained using the theory developed in Begun et al. (1983). Keywords: Conditional score function; Efficient score function; Functional model; Generalized linear model; Measurement error; Structural model.

DESCRIPTORS: (U) *SCORING, *ERROR ANALYSIS, CONSTANTS, ERRORS, ESTIMATES, LINEAR SYSTEMS, LINEARITY, MATHEMATICAL MODELS, MEASUREMENT, OPTIMIZATION, REGRESSION ANALYSIS, FUNCTIONAL ANALYSIS, COVARIANCE

IDENTIFIERS: (U) Canonical forms, Maximum likelihood estimation, PE81102F

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SEARCH CONTROL NO. EWN34M

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NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) M-Estimation for Discrete Data: Asymptotic Distribution Theory and Implications.

(U) R-Trees: A Dynamic Index Structure for Spatial Searching.

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 86.

DESCRIPTIVE NOTE: Interim rept.,

NOV 85 23P

OCT 83 32P

PERSONAL AUTHORS: Simpson, Douglas G. ; Carroll, Raymond J. ; Rupert, David ;

PERSONAL AUTHORS: Guttman, Antonin ; Stonebraker, Michael ;

REPORT NO. NINEO-SER-1586

REPORT NO. UCB/ERL-M83/84

CONTRACT NO. F49620-82-C-0008

CONTRACT NO. AFOSR-83-0284, NSF-ECS83-00483

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A5

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR
TR-86-0337

TR-86-0320

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The asymptotic distribution of an M-estimator is studied when the underlying distribution is discrete. Asymptotic normality is shown to hold quite generally within the assumed parametric family. When the specification of the model is inexact, however, it is demonstrated that an M-estimator with a non-smooth score function, e.g. a Huber estimator, has a non-normal limiting distribution at certain distributions, resulting in unstable inference in the neighborhood of such distributions. Consequently, smooth score functions are proposed for discrete data. Keywords: Robust estimation; M estimator; Discrete parametric model; Smooth score function.

DESCRIPTORS: (U) *ASYMPTOTIC NORMALITY, *PROBABILITY DISTRIBUTION FUNCTIONS, ABNORMALITIES, ASYMPTOTIC SERIES, DISTRIBUTION ESTIMATES, LIMITATIONS, MATHEMATICAL MODELS, PARAMETRIC ANALYSIS, SCORING, DISCRETE DISTRIBUTION

IDENTIFIERS: (U) M estimates, Robust procedures, Smoothing

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ABSTRACT: (U) Spatial data objects often cover areas in multi-dimensional spaces and are not well represented by point locations. For example, map objects like countries, census tracts etc. occupy regions of non-zero size in two dimensions. A common operation on spatial data is to search for all objects in an area. An example would be to find all the countries that have land within 20 miles of a particular point. This kind of spatial search occurs frequently in computer aided design (CAD) and geo-data applications. In such applications it is important to be able to retrieve objects efficiently according to their spatial location. A number of structures have been proposed for handling multi-dimensional point data, and a survey of methods can be found. Cell methods are not good for dynamic structures because the cell boundaries must be decided in advance. Quad trees and k-d trees do not take paging of secondary memory into account. K-D-B trees are designed for paged memory but are only useful for point data. The use of index intervals has been suggested but this method cannot be used on multiple dimensions. Corner stitching is an example of a structure for two-dimensional spatial searching suitable for data objects of non zero size, but it assumes homogeneous primary memory and is not efficient for random searches in very

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AD-A188 531 CONTINUED

large collections of data. Grid files handle non-point data by mapping each object to a point in a higher-dimensional space. This paper describes an alternative structure called an R-tree which represents data objects by intervals in several dimensions.

DESCRIPTORS: (U) *ALGORITHMS, *SEARCHING, BOUNDARIES, COLLECTION, COMPUTER AIDED DESIGN, DYNAMICS, INDEXES, INTERVALS, MEMORY DEVICES, OPERATION, PAGING, POSITION/LOCATION, REGIONS, SECONDARY, TREES, TWO DIMENSIONAL

IDENTIFIERS: (U) PE61102F

AD-A188 530 9/2

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) Implementation Techniques for Main Memory Database Systems.

DESCRIPTIVE NOTE: Interim rept..

JAN 84 24P

PERSONAL AUTHORS: DeWitt, David J.; Katz, Randy M.; Oiken, Frank; Shapiro, Leonard D.; Stonebraker, Michael R.;

REPORT NO. UC28/ERL-84/5

CONTRACT NO. AFOSR-83-0284, NSF-MC382-01880

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-86-0338

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by grants, NSF-MC382-01870, DE-AC02-81ER10920, and W 7405-ENG-48.

ABSTRACT: (U) With the availability of very large, relatively inexpensive main memories, it is becoming possible to keep large databases resident in main memory. This paper considers the changes necessary to permit a relational database system to take advantage of large amounts of main memory. The authors evaluate AVL vs. B+-tree access methods for main memory databases, hash-based query processing strategies vs. sort-merge, and study recovery issues when most or all of the database fits in main memory. As expected, B+-trees are the preferred storage mechanism unless more than 80-90% of the database fits in main memory. A somewhat surprising result is that hash based query processing strategies are advantageous for large memory situations. Keywords: Access; Algorithms. (Author)

DESCRIPTORS: (U) *DATA STORAGE SYSTEMS, ALGORITHMS, DATA BASES, MEMORY DEVICES, TREES

IDENTIFIERS: (U) Relational data bases, PE61102F

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SEARCH CONTROL NO. EVN34M

AD-A168 528 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Bounds for the System Reliability Function

DESCRIPTIVE NOTE: Technical rept..

MAY 85 14P

PERSONAL AUTHORS: Shanthikumar, J. G. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

TASK NO. AB

MONITOR: AFOSR
TR-86-0335

UNCLASSIFIED REPORT

ABSTRACT: (U) A coherent system with independent non-renewable components with arbitrary lifetime distributions is considered. A simple observation leads to a hierarchy of upper and lower bounds that converge to the exact system reliability. The simplest of these bounds is shown to be tighter than the bounds of Gertsbakh (1985). (Author)

DESCRIPTORS: (U) DISTRIBUTION FUNCTIONS, COHERENCE, HIERARCHIES, RELIABILITY

IDENTIFIERS: (U) Upper bounds, Lower bounds, Lifetime distributions, PE61102F

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AD-A168 527 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) On Stochastic Comparison of Random Vectors.

DESCRIPTIVE NOTE: Technical rept..

APR 85 24P

PERSONAL AUTHORS: Shanthikumar, J. G. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

TASK NO. AB

MONITOR: AFOSR
TR-86-0333

UNCLASSIFIED REPORT

ABSTRACT: (U) This document provides sufficient conditions under which two random vectors could be stochastically compared using the standard construction. These conditions are weaker than those discussed by Arjas and Lehtonen and Veinott. Using these conditions the authors present extensions of a result of Block, Bueno, Savits and Shaked concerning the stochastic monotonicity of independent and identically distributed random variables conditioned on their partial order statistics, and a theorem of Efron regarding an increasing property of Polya frequency functions. Applications of these extensions are also pointed out. (Author)

DESCRIPTORS: (U) VECTOR ANALYSIS, COMPARISON, DISTRIBUTION, FREQUENCY, ORDER STATISTICS, RANDOM VARIABLES, STOCHASTIC PROCESSES, FUNCTIONS(MATHEMATICS)

IDENTIFIERS: (U) PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A188 828 8/3 12/1

AD-A188 824 13/9

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

MICHIGAN UNIV ANN ARBOR ROBOT SYSTEMS DIV

(U) First Failure Time of Dependent Parallel Systems with Safety Periods.

(U) Coordinated Research in Robotics and Integrated Manufacturing.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Final rept. 1 Aug 84-30 Oct 85.

FEB 85 27P

NOV 85 128P

PERSONAL AUTHORS: Shanthikumar, J. G. ;

PERSONAL AUTHORS: Atkins, D. E. ; Volz, R. A. ; Gilbert, Elmer E. ; Howe, Robert M. ; Irani, Keki B. ;

CONTRACT NO. AFOSR-84-0208

REPORT NO. RSD-TR-15-85

PROJECT NO. 2304

CONTRACT NO. F49620-82-C-0089

TASK NO. A5

PROJECT NO. 2308

MONITOR: AFOSR

TR-88-0332

TASK NO. A3

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-88-0322

ABSTRACT: (U) This paper considers the time to first failure of a parallel system in which the failure and repair rates of components depend on the state of the other components as well. A back-up unit with a random life time is employed whenever all the components of the system are down. The system fails when all the components of the system and the back-up unit are down. The first moment, the Laplace transform and the probability distribution of the time to first failure of this system are obtained. Sufficient conditions under which this distribution has the new better than used (NBU) and an exponential limit property are given. Special cases with phase type and deterministic back-up unit lifetimes are also considered. These results extend the results of Ross and Schechtman (1979). (Author)

DESCRIPTORS: (U) *SYSTEMS ANALYSIS, *APPLIED MATHEMATICS, BACKUP SYSTEMS, DETERMINANTS(MATHEMATICS), FAILURE, LAPLACE TRANSFORMATION, MOMENTS, PARALLEL ORIENTATION, PARTS, PROBABILITY DISTRIBUTION FUNCTIONS, RATES, REPAIR, TIME

IDENTIFIERS: (U) PE81102F

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UNCLASSIFIED REPORT

ABSTRACT: (U) The research procured under this contract is oriented toward the understanding and development of the flexible robot based manufacturing cells or islands which will increasingly become basic blocks for the building of modern parts production and assembly facilities. Present work spans a hierarchy of sub-systems oriented toward the development and integration of high performance manipulators into flexible manufacturing cells. The research topics being pursued range from highly sophisticated and accurate control algorithms for robot arm control, new types of sensors, analysis and use of advanced sensors information, to higher level languages for robot control, integration of robot systems with CAD databases, and heuristic problem solving techniques.

DESCRIPTORS: (U) *ROBOTICS, *COMPUTER AIDED MANUFACTURING, ALGORITHMS, ASSEMBLY, CELLS, CONTROL, DATA BASES, DETECTORS, HEURISTIC METHODS, INTEGRATED SYSTEMS, INTEGRATION, MANIPULATORS, MANUFACTURING, PARTS, PROBLEM SOLVING, PRODUCTION, ROBOTS, COMPUTER AIDED DESIGN

IDENTIFIERS: (U) PE81102F

AD-A188 824

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SEARCH CONTROL NO. EVN34M

AD-A188 821 8/4

AD-A188 801 12/1

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF ELECTRICAL
ENGINEERINGNORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC
PROCESSES(U) Biological Visual Systems Structures for Machine
Vision Applied to Robotics(U) Stochastic Integration for Operator Valued Processes
on Hilbert Spaces and on Nuclear Spaces. Revision.

DESCRIPTIVE NOTE: Final rept. 15 Sep 84-31 Jan 86.

DESCRIPTIVE NOTE: Technical rept..

FEB 86 333P

MAR 86 80P

PERSONAL AUTHORS: Inigo, Rafael M.; Hsin, Chen H.;
Narathong, Chien-warn; McVey, Eugene S.; Minnick, Jay I.;

PERSONAL AUTHORS: Korezlioglu, H.; Martias, C.;

REPORT NO. UVA-525847/EE88/101

REPORT NO. TR-85

CONTRACT NO. AFOSR-84-0348

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2305

PROJECT NO. 2304

TASK NO. 84

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR

TR-88-0282

TR-88-0328

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the research on a biological visual system (BVS) based sensor with possible applications to robotics and automation. The report covers the following subjects: sensor configuration; edge detection modeling for the human visual system and edge detection using the BVS sensor; qualitative motion detection using the BVS; Target tracking algorithms for the BVS; and Microsaccadic eye movement in the human visual system (HVS). Keywords: Machine visual sensor.

DESCRIPTORS: (U) *EYE, *ROBOTICS, *VISION, SPACE PERCEPTION, NEUROLOGY(BIOLOGY), BIOLOGY, DETECTION, EDGES, EYE MOVEMENTS, MOTION, CONFIGURATIONS, DETECTORS, VISION, HUMANS, ALGORITHMS, TARGETS, TRACKING

SUPPLEMENTARY NOTE: Supersedes AD-A188 878.

ABSTRACT: (U) The representation of a nuclear space valued square integrable martingale by means of another nuclear space valued square integrable martingale is given in terms of stochastic integrals of operator valued processes. The construction of the stochastic integral goes through that of operator valued processes on Hilbert spaces. A new approach is given for the Hilbertian case, so that only the integration of Hilbert-Schmidt operator valued processes is needed to represent square integrable martingales. (Author)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, *OPERATORS(MATHEMATICS), HILBERT SPACE, INTEGRALS, INTEGRATION

IDENTIFIERS: (U) Martingales, Nuclear spaces, WJAFOSR2304A5, PE81102F

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DT C REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A108 499 13/8 8/2

AD-A108 498 14/8 20/8

SRI INTERNATIONAL MENLO PARK CA

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Development System for Flexible Assembly System.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 84-31 Jan 85.

FEB 86 70P

DESCRIPTIVE NOTE: Annual rept. no. 7, 30 Nov 84-30 Nov 85.

PERSONAL AUTHORS: Smith, Randall C. ;

FEB 86 3dP

CONTRACT NO. F49620-84-K-0007

PERSONAL AUTHORS: Leith, E. ;

PROJECT NO. 7308

CONTRACT NO. AFOSR-85-0012

TASK NO. A3

PROJECT NO. 2305

MONITOR: AFOSR

TASK NO. B1

TR-86-0328

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-86-0324

ABSTRACT: (U) We have developed theoretical methods for improving the ability of a computer to estimate spatial relationships among objects when the relationships are uncertain; we have developed a very fast method for determining collisions between a robot and its environment in simulation, suitable for hardware implementation; we are developing a method for estimating the location of a workpiece in a manipulator's hand, by measuring forces and torques on the hand as it moves the object; and we are developing an interactive-graphic, off-line robot workcell programming, modeling, and simulation system, called WORKMATE. WORKMATE has been used to generate a demonstration pick and place task incorporating vision, executed in our laboratory workcell. This document includes the following papers: (1) 'On the Representation and Estimation of Spatial Uncertainty', (2) 'Fast Robot Collision Detection using Graphics Hardware'.

DESCRIPTORS: (U) *ROBOTS, *ELECTROMECHANICAL DEVICES, *COMPUTER APPLICATIONS, ASSEMBLY, COLLISIONS, DETECTION, METHODOLOGY, OFF LINE SYSTEMS, THEORY, TORQUE, VISION, MANIPULATORS, INTERACTIVE GRAPHICS, COMPUTER PROGRAMS

IDENTIFIERS: (U) WORKMATE computer programs, WORKMATE(Workstation Modeling Analysis Training and Emulation), C programming language, LPN-SRI-7239, PE81102F, WUAFDSR2308A3

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UNCLASSIFIED REPORT

ABSTRACT: (U) The theory of holographic optical elements (HOE) made with light of reduced coherence is developed. Both reduced spatial coherence and temporal coherence methods are considered. A theory of broad source fringe formation based on source image distortion is developed. The theory of HOE formation with two zone plates in tandem and under reduced temporal coherence is developed. A new technique of spatial filtering with spatially incoherent light was developed in which the optical system behaves as if the light were coherent (i.e., linear in amplitude and phase preserved) even though the light is spatially incoherent. A technique for obtaining resolution beyond the classical limit (superresolution) was discovered, based on the principle of incoherent to coherent conversion. Keywords: Hologram; Optical element; Interferometry; and Spatial filtering.

DESCRIPTORS: (U) *HOLOGRAPHY, *HOLOGRAMS, COHERENCE, COHERENT OPTICAL RADIATION, DISTORTION, IMAGES, INCOHERENT SCATTERING, INTERFEROMETRY, LIGHT, LIMITATIONS, OPTICAL EQUIPMENT, OPTICAL EQUIPMENT COMPONENTS, REDUCTION, SOURCES, SPATIAL DISTRIBUTION, SPATIAL FILTERING

IDENTIFIERS: (U) Superresolution, PE81102F,

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 498 CONTINUED
WJAF01R230581

AD-A168 493 7/4 7/3

IDAH0 UNIV MOSCOW DEPT OF CHEMISTRY

(U) Gas-Phase Structure of Perfluoro nitrosocyclobutane,

85 4P

PERSONAL AUTHORS: Marsden, Helen M.; Oberhammer, Heinz;
Shreeve, Jean'ne M.;

CONTRACT NO. AFOSR-82-0247

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-86-0328

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, V24 n28
p4766-4768 1985.

ABSTRACT: (U) Perfluoronitrosocyclobutane was prepared from nitrosyl chloride and perfluorocyclobutane in the presence of anhydrous KF and CH₃CN. Both exo conformers (ax-exo and eq-exo) are compatible with experiment. The nitroso group causes considerable angle distortion of the cyclobutane ring. Keywords: Electron diffraction study.

DESCRIPTORS: (U) *ELECTRON DIFFRACTION, *CYCLOBUTANES, ANGLES, CHLORIDES, DISTORTION, RINGS, MOLECULAR STRUCTURE, VAPOR PHASES, SYNTHESIS(CHEMISTRY), REPRINTS

IDENTIFIERS: (U) Butane/Perfluoronitrosocyclo. PER1102F

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AD-A108 481 20/4

AD-A108 481 CONTINUED

MC DONNELL DOUGLAS ASTRONAUTICS CO-ST LOUIS MO

(U) Investigation of an Asymptotic Expansion Technique to Analyze Limit Cycle Response of Aerodynamic Surfaces with Structural Nonlinearities.

DESCRIPTIVE NOTE: Final rept. 13 Sep 84-13 Jul 85.

JUL 88 BOP

PERSONAL AUTHORS: Hauenstein, Anthony J.; Laurensen, Robert M.; Gubser, John L.;

CONTRACT NO. F49620-84-C-0123

PROJECT NO. 2307

TASK NO. 81

MONITOR: AFOSR
TR 88-0288

UNCLASSIFIED REPORT

ABSTRACT: (U) Defining the flutter and divergence characteristics of aerodynamic surfaces is a basic requirement in assuring structural and performance integrity of a given design for its operational environment. Divergence and flutter phenomena are unstable motions with increasing amplitude. For systems containing structural nonlinearities, another mode of aeroelastic response limit cycle oscillation may be present. The potential of limit cycle response is important since these oscillations may occur within the aerodynamic surface flutter and divergence flight envelope and may lead to fatigue damage of the system even through aeroelastic instability is not encountered. The objective of this thesis is to evaluate, on a comparative basis, different numerical simulation approaches for predicting limit cycle response of aerodynamic surfaces containing discrete structural nonlinearities. Results from such simulations are needed to compare and evaluate approximate solutions for the limit cycle response of nonlinear systems. In addition, these simulation results provide information concerning the nature of the nonlinear system response which may be used to aid in understanding the mechanism of the aerodynamic surface dynamics and in understanding the

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response of nonlinear systems in general. The numerical integration techniques selected for evaluation were: fourth-order Runge-Kutta, eighth-order Shanks, and fourth-order Adams-Moulton predictor-corrector. Results of the three simulation techniques compared well with each other. Keywords: Limit cycle oscillation, Structural nonlinearity, Flutter analysis.

DESCRIPTORS: (U) *AERODYNAMIC CONTROL SURFACES, *FLUTTER, *NUMERICAL METHODS AND PROCEDURES, *MATHEMATICAL PREDICTION, ASYMPTOTIC SERIES, DAMAGE, FATIGUE (MECHANICS), MATHEMATICAL MODELS, METHODOLOGY, MOTION, NONLINEAR SYSTEMS, NUMERICAL ANALYSIS, NUMERICAL INTEGRATION, OSCILLATION, SIMULATION, SOLUTIONS (GENERAL), THESES, DYNAMIC RESPONSE, CYCLIC TESTS, AEROELASTICITY

IDENTIFIERS: (U) PER1102P

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN34M

AD-A168 487 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Estimating Weights in Heteroscedastic Regression Models by Applying Least Squares to Squared or Absolute Residuals.

DESCRIPTIVE NOTE: Technical rept. Aug 88-Aug 88.

OCT 88 40P

PERSONAL AUTHORS: Carroll, Raymond J.; Davidian, Marie; Rupert, David;

REPORT NO. NIMED- SER-1584

CONTRACT NO. F49620-82-C-0008

MONITOR: AFOSR
TR 88-0318

UNCLASSIFIED REPORT

ABSTRACT: (U) This document considers a nonlinear regression model for which the variances depend on a parametric function of known variables. The authors focus on estimating the variance function, after what it is typical to estimate the mean function by weighted least squares. Most often, squared residuals from an unweighted least squares fit are compared to their expectations and used to estimate the variance function. If properly weighted such methods are asymptotically equivalent to normal-theory maximum likelihood. Instead, one could use the deviations of the absolute residuals from their expectations. Constructed is such an estimator of the variance function based on absolute residuals whose asymptotic efficiency relative to maximum likelihood is precisely the same for symmetric errors as the asymptotic efficiency in the one-sample problem of the mean absolute deviation relative to the sample variance. The estimators are computable using nonlinear least squares software. The results hold with minimal distributional assumptions. (Author)

DESCRIPTORS: (U) *WEIGHTING FUNCTIONS, COMPUTER PROGRAMS, ERRORS, LEAST SQUARES METHOD, MATHEMATICAL MODELS, MAXIMUM LIKELIHOOD ESTIMATION, MEAN, NONLINEAR ANALYSIS, PARAMETRIC ANALYSIS, REGRESSION ANALYSIS, RESIDUALS, SAMPLING, SIMMETRY, VARIATIONS, ESTIMATES

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AD-A168 484 17/2.1

SOUTHERN METHODIST UNIV DALLAS TEX DEPT OF ELECTRICAL ENGINEERING

(U) Spread Spectrum Mobile Radio Communications.

DESCRIPTIVE NOTE: Interim rept. 1 Sep 84-31 Mar 88.

MAR 88 108P

PERSONAL AUTHORS: Gupta, S. C.;

CONTRACT NO. AFOSR-82-0308

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR
TR 88-0323

UNCLASSIFIED REPORT

ABSTRACT: (U) In this report we present some additional results on the performance of carrier sense multiple access (CSMA) protocol for mobile packet radio networks (WPNET). This is followed by a review of bandwidth efficient digital modulation for mobile radios and some results on a speech transmission scheme and an analysis of mismatched continuous phase FSK (CPFSK) receivers. Carrier sense multiple access protocol has been analyzed in detail for mobile radio channel. Throughput and delay expression are derived to include the effects of fading. The performance degradation due to hidden terminal problems is analyzed. This is followed by an evaluation of the performance of CSMA with collision detection (CSMA-CD) for FH-FSK spread spectrum mobile packet radio networks. A class of spectrally efficient modulation has been reviewed for application to mobile radio systems. A speech transmission scheme using DPCM coding and these spectrally efficient modulation is seen to compete with existing schemes. Mismatched CPFSK receivers have been analyzed to understand how time and phase synchronization errors influence the performance. A set of curves is provided to demonstrate the degradation due to imperfect carrier phase of symbol time synchronization error for both low and high SNR.

DESCRIPTORS: (U) *COMMUNICATIONS NETWORKS, *PACKETS,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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*COMMUNICATION AND RADIO SYSTEMS, *RADIO TRANSMISSION,
*SPEECH TRANSMISSION, CHANNELS, CODING, COLLISIONS,
DEGRADATION, DETECTION, DIGITAL SYSTEMS, ERRORS, MOBILE,
MODULATION, RADIO EQUIPMENT, SYMBOLS,
SYNCHRONIZATION(ELECTRONICS), TIME

IDENTIFIERS (U) PEB1102F

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) A Note on Adapting for Heteroscedasticity When the
Variances Depend on the Mean.

DESCRIPTIVE NOTE: Technical rept.,

OCT 85 20P

PERSONAL AUTHORS: Carroll, Raymond J. ; Ruppert, David ;
Stefanski, Leonard A. ;

REPORT NO. MKS-1583

CONTRACT NO. F49820-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0316

UNCLASSIFIED REPORT

ABSTRACT: (U) This document considers the normal-theory regression model when the error disturbances are heteroscedastic, i.e., have non-constant variances. The author distinguishes two cases: 1) predictor heteroscedasticity, where the variances depend on a function g of known quantiles and 2) mean heteroscedasticity, where the variances depend on a function g of the means. For the case where g is unknown, Carroll showed by construction that, in certain cases, it is possible to estimate the regression parameter asymptotically as well as if g were known and weighted least squares applied. This document reconsiders this problem from the information bound theory of Begun, Hall, Huang & Wellner. For mean heteroscedasticity, a rather surprising result is obtained. If g were known in this case, Jobson & Fuller showed that the maximum likelihood estimate is asymptotically more efficient than weighted least squares with known weights. When g is unknown the full Jobson & Fuller improvements are not possible; however, we show that one can, in theory, attain asymptotically better performance than weighted least squares with known weights. Keywords: Adaptation; Linear models.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

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DESCRIPTORS: (U) *REGRESSION ANALYSIS, ASYMPTOTIC
NORMALITY, ANALYSIS OF VARIANCE, ERRORS, PARAMETERS,
LINEARITY, MATHEMATICAL MODELS, LEAST SQUARES METHOD,
WEIGHTING FUNCTIONS

IDENTIFIERS: (U) *Heteroscedasticity, Maximum likelihood
estimation

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