

AD 683600

**A DDC BIBLIOGRAPHY ON
COMPUTER - AIDED LOGICAL PROCESSES**

(Information Sciences Series)

VOLUME I OF II VOLUMES

DDC-TAS-68-77

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AD-603 600

A DDC BIBLIOGRAPHY ON

COMPUTER - AIDED LOGICAL PROCESSES
(INFORMATION SCIENCES SERIES)

Volume I of II Volumes

DDC-TAS-68-77

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DECEMBER 1968

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U N C L A S S I F I E D a n d U N L I M I T E D

P R E F A C E

This Unclassified and Unlimited bibliography compiles references cataloged by DDC since 1953 and deals with Computer-Aided Logical Processes. The references include all research on the processes of information handling and also the application of fundamental mathematical theory to the construction or better understanding of information systems.

The 186 citations are grouped under six major headings which correspond directly to those of the Panel on Information Science Technology, Committee on Scientific and Technical Information, Federal Council for Science and Technology. These headings are: Computer Logic; Biological Information Handling; Human Factor Information Handling; Programmed Instruction; Network and Switching Systems Theory; and Information, Communication, and Systems Theory.

Entries are arranged in accession number (AD-number) sequence within each major heading. Four indexes, Corporate Author-Monitoring Agency, Personal Author, Contract and AD-Numeric, are appended to facilitate access to the references.

An Unclassified and Limited version of this bibliography has been compiled and will be announced in the *Technical Abstract Bulletin* (TAB).

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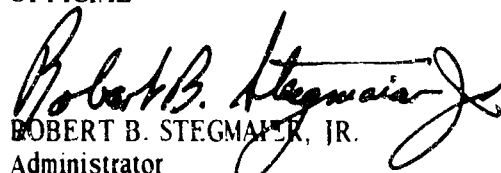

ROBERT B. STEGMAYER, JR.
Administrator
Defense Documentation Center

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COMPUTER LOGIC

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-282 818

BURROUGHS CORP PHILADELPHIA PA

MAGNETIC PARAMETRON LOGIC ELEMENTS (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1 APR-

30 JUN 62;

JUN 62

IV

EINHORN, S.N.; POWELL, W.S.;

CONTRACT: DA36 039SC89204

PROJ: 3A99-15-001-03

UNCLASSIFIED REPORT

DESCRIPTORS: *COMPUTER LOGIC, *DIGITAL COMPUTERS,
*MICROMETERS, MAGNETIC TAPE, PRINTED CIRCUITS, THIN
FILMS (STORAGE DEVICES) (U)

IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS,
PARAMETRONS (U)

RESEARCH IS BEING DIRECTED TOWARD THE DEVELOPMENT OF ADVANCED PARAMETRON ELEMENTS, CONFIGURATIONS, CIRCUIT ARRANGEMENTS, AND MODES OF OPERATION SUITED TO PERFORM LOGIC FUNCTIONS IN DATA PROCESSING SUB-SYSTEMS. EMPHASIS IS PLACED ON THE REALIZATION OF RELIABLE MAGNETIC-FILM PARAMETRONS WHICH LEND THEMSELVES TO LARGE SCALE PRODUCTION AT LOW COST. A PART OF THE PARAMETRON DESIGN EFFORT WAS A STUDY OF DEMAGNETIZING FIELDS, WHICH POINTS TO THE FEASIBILITY OF SMALL COILS WITH 3 BY 3 MM FILM ELEMENTS. INDUCTANCE MEASUREMENTS AND OPERATIONAL TESTS OF PARAMETRON COILS HAVE, SO FAR, LED TO AN OPTIMUM DESIGN HAVING 34 TURNS OF NO. 44 WIRE. HOWEVER, AN EFFORT IS UNDERWAY TO REDUCE THE NUMBER OF TURNS, SINCE THE CAPACITANCE REQUIRED FOR RESONANCE AT THE 25-MC SIGNAL FREQUENCY IS SMALL COMPARED TO THE ESTIMATED WIRING CAPACITANCE. A MODEL INCORPORATING PROPOSED PACKAGING TECHNIQUES WAS CONSTRUCTED. THE TECHNIQUES INCLUDE A PRINTED CIRCUIT BOARD FOR LOGIC INTERCONNECTIONS, A GROUND PLANE WHICH BOTH COMPLETES THE LOGIC SIGNAL PATHS AND SHIELDS THE SIGNAL CIRCUITS FROM THE PUMP FIELDS, AND A MINIATURE PRINTED CIRCUIT PARAMETRON COMPONENT BOARD. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZAD463

AD-283 487

ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS
A COMPARISON OF TWO LOGIC SYMBOL CODING TECHNIQUES IN
A SIMULATED DIGITAL DEVICE MAINTENANCE
ENVIRONMENT (U)

JUL 62 IV BAKER, JAMES D.; WHITEHURST, ALBERT J.:

REPT. NO. TDR62 196

MONITOR: ESJ TDR62 196

UNCLASSIFIED REPORT

DESCRIPTORS: *DATA PROCESSING SYSTEMS, *DIGITAL
COMPUTERS, *LANGUAGE, ANALYSIS OF VARIANCE, CIRCUITS,
CODING, COMPUTER LOGIC, CONFIGURATION, DIGITAL
SYSTEMS, HUMAN ENGINEERING, MAINTENANCE, MATHEMATICAL
LOGIC, TRAINING DEVICES, WIRING DIAGRAMS (U)

THIS STUDY WAS DESIGNED TO EVALUATE WHICH OF TWO
TECHNIQUES IS BETTER FOR ENCODING THE LOGIC SYMBOLS
IN DETAILED LOGIC DIAGRAM TO CONVEY INFORMATION
ABOUT DIGITAL CIRCUITS. ONE TECHNIQUE EMPLOYED
SHAPE ENCODING TO DIFFERENTIATE BASIC LOGIC
FUNCTIONS; THE OTHER USED ALPHABETIC IDENTIFIERS.
THE FINDINGS SHOWED THAT USING SHAPE ENCODED
SYMBOLS IN SIMULATED DETAILED LOGIC DIAGRAMS
RESULTED IN A SIGNIFICANT REDUCTION IN THE TIME
REQUIRED TO SOLVE MAINTENANCE TYPE PROBLEMS. IT
IS CONCLUDED THAT SHAPE ENCODING IS THE BETTER OF THE
TWO TECHNIQUES, FOR USE IN OPERATIONAL SITUATIONS,
IF TIME-SAVING IS OF CONCERN. BASED UPON
OBSERVATIONS MADE DURING THE DESIGN AND CONDUCT OF
THIS STUDY, TWO SETS OF RECOMMENDATIONS ARE MADE.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-286 295

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
THREADED LIST STRUCTURES IN THE DESIGN AUTOMATION OF
STROKE LOGIC (U)

JUL 62 IV UBER, G.T.:
REPT. NO. 6 90 62 55

UNCLASSIFIED REPORT

DESCRIPTORS: •ALGEBRAS, •AUTOMATION, •COMPUTER LOGIC,
•DIGITAL COMPUTERS, TOPOLOGY (U)

A SYSTEM IS DESCRIBED WHICH WAS DEVELOPED AS PART OF A PROGRAM TO INVESTIGATE TECHNIQUES FOR MINIMIZING AND IMPLEMENTING DIGITAL LOGIC. THE APPROACH WAS THAT OF MANIPULATING A DATA STRUCTURE WHICH CLOSELY REPRESENTS THE FINAL HARDWARE REALIZATION. THE COMMON USE OF SHEFFER-STROKE CIRCUITRY, PLUS THE SIMPLICITY OF A MODEL USING A SINGLE LOGICAL CONNECTIVE, HAS MADE IT POSSIBLE TO DEVELOP A SYSTEM BASED UPON STROKE LOGIC. THE INITIAL INVESTIGATION WAS CONCERNED WITH MINIMIZING TREES OF SINGLE-OUTPUT DEVICES. THESE CAN BE COMPACTLY REPRESENTED INSIDE A COMPUTER BY MEANS OF THREADED LIST STRUCTURES WHICH WERE DEVELOPED BY PERLIS AND THORNTON. THE SECTIONS DISCUSS THE TRANSLATION OF BOOLEAN EQUATIONS INTO THREADED LIST STRUCTURES AND THE MANIPULATION OF THESE STRUCTURES. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-428 087

ADAPTRONICS INC MCLEAN VA

THEORY OF PROBABILITY STATE VARIABLE SYSTEMS. VOLUME

III. MONOTYPE SYSTEM THEORY AND CONSIDERATIONS FROM

AUTOMATA THEORY, (U)

DESCRIPTIVE NOTE: FINAL REPT., 15 OCT 61-14 OCT 62,

DEC 63 141P GILSTRAP, L. O., JR.;

PEDELTY, M. J. LEE, R. J. ;

CONTRACT: AF33 657 7100

PROJ: 1 7 4160

TASK: 416004

MONITOR: ASD TDR63 664, VOL. 3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•TEACHING MACHINES, MATHEMATICAL ANALYSIS), (•COMPUTER LOGIC), COMPUTERS, CYBERNETICS, MEMORY, PATTERN RECOGNITION, PROBABILITY, NETWORKS, COMMUNICATION THEORY, SWITCHING CIRCUITS, MATHEMATICAL LOGIC (U)

IDENTIFIERS: 1962, NEUROTRON, AUTOMATON, GENOTYPE NETWORKS, AUTOMATA THEORY, MONOTYPE NETWORKS, OPEN-LOOP NETWORKS, PERCEPTRONS (U)

THE SUBJECT OF PROBABILITY STATE VARIABLE SYSTEMS IS EXAMINED FROM TWO POINTS OF VIEW. THE FIRST POINT OF VIEW IS THAT OF AUTOMATA THEORY AND THE PROBLEMS OF AUTOMATON ENVIRONMENT INTERACTION IS DISCUSSED. SECONDLY, A DETAILED STRUCTURAL MODEL OF A GENERALIZED SWITCHING DEVICE IS FORMULATED AND THE MAJOR PROBLEMS OF INTEREST IN THE THEORY OF MONOTYPE PROBABILITY STATE VARIABLE SYSTEMS ARE DESCRIBED. NOVEL MATHEMATICAL METHODS FOR DETERMINING PROPERTIES OF THE PROBABILITY STATE VARIABLE DEVICE ARE DEVELOPED. AN INDEX NOTATION FOR LOGIC PROBLEMS IS PRESENTED AND SOME OF THE GENERAL PROPERTIES OF SWITCHING NETWORKS ARE ANALYZED USING THIS NOTATION. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-429 098

WESTERN RESERVE UNIV CLEVELAND OHIO
MATHEMATICAL FORMULATION OF BASIC PROCEDURES IN
DOCUMENTATION,

(U)

APR 60 SOP

FERRY, JAMES W. I

GOFFMAN, WILLIAM I

CONTRACT: AF49 638 357

MONITOR: AFOSR

TN60 366

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON THEORY OF DOCUMENTATION
AND STRATEGY OF SEARCHING.

DESCRIPTORS: (*DOCUMENTATION, THEORY) (*COMPUTER
LOGIC, DOCUMENTATION), INFORMATION RETRIEVAL, SUBJECT
INDEXING, CODING, ABSTRACTS, MANNED, AUTOMATION,
PROGRAMMING (COMPUTERS), DECISION MAKING, MATHEMATICAL
LOGIC, COMPUTERS, DESIGN

(U)

IDENTIFIERS: FLOW CHARTS, 1960

(U)

CERTAIN BASIC ASPECTS OF DOCUMENTATION, ESPECIALLY
THE RELATIONSHIP OF A "MESSAGE" TO ALTERNATE MEANS
FOR ITS EXPRESSION AND RECORDING WERE STUDIED.
ATTENTION WAS ALSO DIRECTED TO VARIOUS
DOCUMENTATION PROCESSES IN WHICH THE MESSAGE REMAINS
INVARIANT, THOUGH THE SYMBOLISM FOR EXPRESSING IT MAY
BE GREATLY ALTERED. IN CONSIDERING MATHEMATICAL
FORMULATION, THIS LED TO SUCH CONCEPTS AS THE MESSAGE
AS A SET, WHICH MAY FIND EXPRESSION IN AN EQUIVALENCE
CLASS OF SETS, EACH OF WHICH IS A VERSION OF A GIVEN
MESSAGE. THE CONCEPT OF SET, IN TURN, LED US TO
SUCH CONCEPTS AS SETS OF SETS, SUB-SETS, AND
IRREDUCIBLE SUB-SETS ALSO SOMETIMES CALLED "UNIT
ELEMENTS." THE CONCEPTS OF MAPPING AND INVERSE
MAPPING WERE ALSO SHOWN TO BE DIRECTLY INVOLVED WHEN
DEALING WITH SUCH EQUIVALENCE CLASSES. THESE
CONCEPTS ARE OF ESSENTIAL IMPORTANCE FOR CONSIDERING
IN A UNIFORM AND RIGOROUS MANNER A VERY WIDE RANGE OF
DOCUMENTATION PROCESSES RANGING FROM TRANSLATING FROM
ONE NATURAL LANGUAGE TO ANOTHER TO ALPHABETICAL
INDEXING, ENCODING FOR MACHINE SEARCHING, AND
ABSTRACTING, PERFORMED EITHER BY PEOPLE OR BY
PROGRAMMED MACHINES. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZAC463

AD-433 802

STANFORD RESEARCH INST MENLO PARK CALIF

CELLULAR LINEAR-INPUT LOGIC.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

FEB 64 248P

MINNICK, ROBERT C. ;

SHORT, ROBERT A. ;

CONTRACT: AF19 628 498

PROJ: 4641, SRI PROJ. 4122

TASK: 464101

MONITOR: AFRL 64 6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTER LOGIC, LINEAR SYSTEMS),
(*DATA STORAGE SYSTEMS, NETWORKS), CIRCUITS, GEOMETRIC
FORMS, BIBLIOGRAPHIES, MATHEMATICAL LOGIC, SWITCHING
CIRCUITS, CASCADE STRUCTURES, DATA PROCESSING SYSTEMS,
TOPOLOGY, COMPUTER LOGIC, SEQUENCES, TRIGGER CIRCUITS (U)
IDENTIFIERS: 1964, CELLULAR ARRAYS, ARRAYS, TREES,
RECTANGLES, TESSELLATIONS, ADDER ARRAY (U)

A NUMBER OF DIFFERENT CELLULAR ARRAYS ARE PROPOSED
AND STUDIED IN THIS REPORT. THESE ARRAYS FALL INTO
TWO STRUCTURAL CLASSES: NAMELY, TREES AND
RECTANGLES. IT IS SHOWN IN THE REPORT THAT THEY
CAN BE USED FOR A WIDE VARIETY OF DIGITAL TASKS.
SOME OF THE MORE IMPORTANT POTENTIAL APPLICATIONS
OF CELLULAR ARRAYS ARE CONSIDERED. A CONNECTION
BETWEEN CELLULAR ARRAYS AND TESSELLATIONS IS ALSO
POINTED OUT. CELLULAR ARRAYS FOR THE PRODUCTION OF
COMBINATIONAL DIGITAL LOGIC ARE STUDIED. ARRAYS OF
MAJORITY GATES ARE STUDIED BOTH IN TERMS OF TREES AND
RECTANGLES. METHODS ARE DEVELOPED FOR SYNTHESIZING
ARBITRARY COMBINATIONAL FUNCTIONS WITH A MINIMUM
NUMBER OF GATES, WITHIN CERTAIN STRUCTURAL
ASSUMPTIONS. AN ADDER ARRAY IS DESCRIBED AND
STUDIED IN THIS SECTION. THESE ARRAYS PRODUCE
SEVERAL ARBITRARY COMBINATIONAL FUNCTIONS OF A SET OF
INPUT VARIABLES. SEVERAL THEOREMS ARE PROVED
RELATING TO THE TYPES OF POSSIBLE ADDER ARRAYS AND TO
THE NUMBER OF CELLS IN THEM. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-436 349

LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
RESEARCH ON AUTOMATIC COMPUTER ELECTRONICS. VOL. II.
LOGICAL DESIGN RESEARCH. (U)

DESCRIPTIVE NOTE: FINAL REPT., 1 SEP 62-1 OCT 63,
FEB 64 293P TANAKA, RICHARD I. ;

CONTRACT: AF33 657 8777

PROJ: AF-7062

TASK: 7062093, 7062-04

MONITOR: RDT TDR-63-4173-VOL-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (COMPUTERS, DESIGN), COMPUTER LOGIC,
ALGEBRAS, CIRCUITS, S-MATRIX, SWITCHING CIRCUITS,
SPECIAL FUNCTIONS, TABLES, SET THEORY, DATA STORAGE
SYSTEMS, SPECIAL PURPOSE COMPUTERS (U)
IDENTIFIERS: 1964, BOOLEAN ALGEBRA, MINIMIZATION,
TERNARY ALGEBRA, RACE PROGRAM, ALGORITHMS, RESIDUE
NUMBERS, THRESHOLDS (MATH) (U)

THRESHOLD LOGIC AND TERNARY LOGIC DESIGN RESEARCH
IS DESCRIBED IN THIS BOLUME. THE DESCRIPTION OF
THRESHOLD LOGIC INCLUDES THEORETICAL RESULTS USABLE
FOR SYNTHESIZING THRESHOLD FUNCTIONS BY MEANS OF
ORTHOGONAL EXPANSIONS, BOOLEAN TECHNIQUES, OR
DECOMPOSITION METHODS. DESIGN TECHNIQUES WHICH
CONSIDER CONSTRAINTS IMPOSED BY PRACTICAL CIRCUIT
CONSIDERATIONS ARE ALSO DESCRIBED, ALONG WITH THE
ASSUMPTIONS WHICH DEFINE THE CONSTRAINTS. THE WORK
ON TERNARY LOGIC IS INTENDED TO BE A PRELUDE TO LATER
EXTENSION TO P-VALUED LOGIC. THE TWO MAJOR
APPROACHES FOLLOWED ARE: (1) DERIVING SUITABLE
TERNARY ALGEBRA SYSTEMS WHICH INCLUDE PROPERTIES
DESIRABLE FOR MINIMIZING LOGIC EXPRESSIONS, AND
(2) DEVISING METHODS FOR EXPRESSING TERNARY
FUNCTIONS IN FORMS SUITABLE FOR IMPLEMENTATION BY
TERNARY ELEMENTS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-439 014

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

AN ALGORITHM FOR SYNTHESIZING NOR LOGIC

CIRCUITS,

(U)

FEB 64 81P THEADO, DONALD I

REPT. NO. 1222 21

CONTRACT: AF33 616 7443

PROJ: 4144

TASK: 414408

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (COMPUTER LOGIC, SYNTHESIS), DIGITAL
COMPUTERS, CIRCUITS, NETWORKS, TRANSISTORS, SWITCHING
CIRCUITS

(U)

IDENTIFIERS: NOR CIRCUITS, NAND CIRCUITS

(U)

THE PROBLEM OF SYNTHESIZING NOR AND NAND LOGIC
DIAGRAMS FOR THE GENERATION OF LOGIC FUNCTIONS IS
STUDIED AND A TECHNIQUE IS PRESENTED. THE
SYNTHESIS PROCEDURE IS SO DEVELOPED THAT IT CAN BE
CARRIED OUT MANUALLY OR BY USING A DIGITAL COMPUTER.
(AUTHOR)

(U)

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DD REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-601 987

OFFICE OF NAVAL RESEARCH WASHINGTON D C
THE LOGICAL DESIGN OF A MULTICHANNEL DEVICE FOR THE
RETRIEVAL OF INFORMATION. (U)

APR 64 208P WANNER, VANCE R. I
MONITOR: ONR ACR93

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INFORMATION RETRIEVAL, DIGITAL
COMPUTERS); (*COMPUTER LOGIC, DIGITAL COMPUTERS),
MULTIPLE OPERATION, INPUT-OUTPUT DEVICES, DATA STORAGE
SYSTEMS, DATA PROCESSING SYSTEMS, DESIGN, SEARCH
THEORY (U)

THE PAPER OUTLINES A PRELIMINARY LOGICAL
INVESTIGATION OF A DATA RETRIEVAL SYSTEM IN WHICH
WORD BITS ARE HANDLED IN PARALLEL AND IN WHICH THE
INTERROGATION PLAN IS NOT CONSTRAINED TO CONFORM
NECESSARILY TO A PREORDAINED SET OF INTERROGATION
KEYS. ALTHOUGH THE SYSTEM IS GENERALLY DESCRIBED,
ATTENTION IS FOCUSED PRIMARILY UPON THE HEART OF THE
SYSTEM, A COMPARATOR UNIT WHOSE PURPOSE IS TO EXTRACT
FROM THE LARGER BODY OF STORED DATA THAT WHICH IS
GERMANE TO ANY SPECIFIC SET OF INTERROGATION
CRITERIA. SINCE THE TREATMENT IS NOT ORIENTED IN
THE DIRECTION OF ANY UNIQUE USAGE, THE APPROACH IS
QUITE GENERAL AND, FURTHERMORE, DOES NOT EXTEND INTO
ELECTRONIC PACKAGING OR CIRCUITING. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-608 155

LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
MULTIPLE SHIFT REGISTER REALIZATIONS OF SEQUENTIAL
MACHINES,

(U)

OCT 64 136P NICHOLS, A. J. , III. I
REPT. NO. LOCK-6-74-64-48

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTERS, SYNTHESIS), (*COMPUTER
STORAGE DEVICES, COMPUTER LOGIC), (*COMPUTER LOGIC,
COMPUTER STORAGE DEVICES), SWITCHING CIRCUITS,
SEQUENCES, INPUT-OUTPUT DEVICES

(U)

IDENTIFIERS: SHIFT REGISTERS, SEQUENTIAL MACHINES,
ALGORITHMS

(U)

THE STUDY IS CONCERNED WITH THE PROBLEM OF
MECHANIZING SYNCHRONOUS SEQUENTIAL MACHINES WITH
SHIFT REGISTERS. IT IS SHOWN THAT ANY MACHINE CAN
BE MECHANIZED WITH SHIFT REGISTERS. THE
DETERMINATION OF THE LEAST NUMBER OF SHIFT REGISTERS
REQUIRED IN A MECHANIZATION OF A GIVEN MACHINE IS
INVESTIGATED. A 20-STEP ALGORITHM, SUITABLE FOR
PROGRAMMING ON A DIGITAL COMPUTER, IS DEVELOPED WHICH
STARTS WITH THE STATE TABLE OF THE GIVEN MACHINE AND
YIELDS MECHANIZATIONS HAVING THE LEAST POSSIBLE
NUMBER OF SHIFT REGISTERS. THE APPLICATION OF THE
ALGORITHM TO SYSTEMS DESIGN IS CONSIDERED, AND A
METHOD IS GIVEN FOR DECOMPOSING THE SYSTEM, DESIGNING
EACH OF THE SUBMACHINES, AND THEN COMBINING THESE
DESIGNS INTO A MECHANIZATION OF THE SYSTEM. IN
ADDITION, IT IS DEMONSTRATED THAT THE ALGORITHM MAY
BE APPLIED TO LOGIC SYSTEMS HAVING THREE OR MORE
VALUES AS OPPOSED TO THE CONVENTIONAL, BINARY SYSTEM.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-613 060

CASE INST OF TECH CLEVELAND OHIO

LOGIC OF CONTROLLED THRESHOLD DEVICES.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

FEB 65 250P

KLOCK, H. F. IHANEY, R. D. I

CONTRACT: AF30 602 2518

PROJ: 5519

TASK: 551901

MONITOR: RADC ,

TDR-64-173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-297 862.

DESCRIPTORS: (COMPUTER LOGIC, CONTROL SEQUENCES),
(CONTROL SEQUENCES, COMPUTER LOGIC), SYNTHESIS, DATA
STORAGE SYSTEMS, GATES (CIRCUITS), DIGITAL COMPUTERS,
MATRIX ALGEBRA

(U)

IDENTIFIERS: THRESHOLD LOGIC

(U)

THE SYNTHESIS OF THRESHOLD LOGIC CIRCUITS FROM SEVERAL POINTS OF VIEW IS PRESENTED. THE FIRST APPROACH IS APPLICABLE TO RESISTOR-TRANSISTOR NETWORKS IN WHICH THE OUTPUTS ARE TIED TO A COMMON COLLECTOR RESISTOR. IN GENERAL, FEWER THRESHOLD LOGIC GATES THAN NOR GATES CONNECTED TO A COMMON COLLECTOR RESISTOR ARE REQUIRED. SYNTHESIS TECHNIQUES BASED UPON THE USE OF BOOLEAN MATRICES ARE PRESENTED. IN THIS CASE THE GOAL OF THE SYNTHESIS IS A NETWORK TO REALIZE A SPECIFIED FUNCTION SUCH THAT THE FAILURE OF ANY BUT THE OUTPUT GATE CAN BE COMPENSATED FOR BY A CHANGE IN THE THRESHOLD LEVEL (AND POSSIBLY CHANGES IN THE WEIGHTS OF THE INPUTS). IN GENERAL, THE ABILITY TO COMPENSATE FOR A FAILURE REQUIRES THE SYNTHESIS OF A NETWORK WITH MORE GATES THAN IF NO COMPENSATION WERE REQUIRED. THE NET RESULT IS THAT THE SYNTHESIS IS AN INVOLVED PROCEDURE. A MECHANISM FOR CHANGING WEIGHTS OF THRESHOLD GATES USING A PHOTO-DIODE MATRIX IS PRESENTED. THE DESIGN OF THE CONTROL SYSTEM FOR AN IBM TYPE 350 DISC FILE IS PRESENTED AS AN ILLUSTRATION OF THE DESIGN OF A PRACTICAL SYSTEM IN WHICH THRESHOLD LOGIC IS EMPLOYED. THE FUNCTION OF THE CONTROL SYSTEM IS TO POSITION THE READ-WRITE HEADS OVER THE SPECIFIED TRACK OF A SPECIFIED DISC TO READ IN OR TO READ OUT DATA. LESS LOGIC CIRCUITRY IS REQUIRED IF THRESHOLD LOGIC RATHER THAN NOR LOGIC IS USED. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-614 691

POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH
INST

ON THE APPROXIMATE IDENTIFICATION OF PROCESS DYNAMICS
IN COMPUTER CONTROLLED ADAPTIVE SYSTEMS, (U)

OCT 59 23P BRAUN, L. , JR.; MISHKIN, E. I

TRUXAL, J. G. I

REPT. NO. R-745-59 , PIB-673

CONTRACT: DA30 0690RD2646 , DA30 0690RD1560

MONITOR: AROD , 2E 2268:

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ADAPTIVE CONTROL SYSTEMS, COMPUTER
LOGIC), (*COMPUTER LOGIC, ADAPTIVE CONTROL SYSTEMS),
COMMUNICATION THEORY, SIGNALS, ANALOG COMPUTERS,
SWITCHING CIRCUITS, SPECIAL FUNCTIONS (MATHEMATICAL),
POLYNOMIALS, TRANSFORMATIONS (MATHEMATICS), EQUATIONS,
SWITCHING CIRCUITS (U)

MODERN CONTROL SYSTEMS ARE COMPLEX AND MUST MEET
STRINGENT PERFORMANCE REQUIREMENTS. THERE IS AN
OBVIOUS NEED IN SUCH SYSTEMS FOR DEVELOPMENT OF
DESIGN PROCEDURES FOR COMPUTER-CONTROLLED SYSTEMS
WHICH MAKE USE OF THE HIGHLY DEVELOPED COMPUTER ART.
THIS PAPER PRESENTS AN ATTEMPT TO APPLY COMPUTERS
IN THE SOLUTION OF ONE CLASS OF SUCH SYSTEMS. THE
REALIZATION OF THE NOVEL COMPUTER CIRCUITS REQUIRED
IS OUTLINED, AND THE OVERALL DESIGN LOGIC IS
PRESENTED. THE DESIGNER VERSED IN THE ART WILL
HAVE NO DIFFICULTY INTEGRATING THE INDIVIDUAL
CIRCUITS. IT APPEARS THAT ANALOG CIRCUITS
INTERCONNECTED BY MEANS OF SWITCHING DEVICES WILL BE
USEFUL IN THE REALIZATION OF THE REQUIRED COMPUTING
CIRCUITS. THE REQUIRED COMPUTER FACILITY SEEMS TO
BE REASONABLE, AND COMMENSURATE WITH THE CONTROL
PROBLEM. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-616 325

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
SYMMETRIC TERNARY SWITCHING FUNCTIONS; THEIR
DETECTION AND REALIZATION WITH THRESHOLD LOGIC, (U)
JUN 65 76P MERRILL, ROY DEWITT, JR.:
REPT. NO. 6-75-65-29

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SWITCHING CIRCUITS, COMPUTER
LOGIC), (*COMPUTER LOGIC, SWITCHING CIRCUITS),
(*SPECIAL FUNCTIONS(MATHEMATICAL), SWITCHING
CIRCUITS), DIGITAL SYSTEMS, DIGITAL COMPUTERS,
NETWORKS, SYNTHESIS (U)
IDENTIFIERS: SWITCHING FUNCTIONS (U)

THE IMPORTANT PROPERTIES OF SYMMETRIC FUNCTIONS ARE
PRESENTED AND A SYSTEMATIC PROCEDURE IS DEVELOPED FOR
DETECTING THESE FUNCTIONS. A DESIGN METHOD IS
GIVEN WHEREBY SYMMETRIC FUNCTIONS CAN BE SYNTHESIZED
WITH NETWORKS WHICH ARE ECONOMICAL AND, IN CERTAIN
INSTANCES, MINIMAL IN THE NUMBER OF TERNARY THRESHOLD
DEVICES REQUIRED. THE PRACTICAL CONSEQUENCES OF
THESE RESULTS ARE DEMONSTRATED BY APPLYING DETECTION
AND LOGIC DESIGN TECHNIQUES TO A TYPICAL DIGITAL
SYSTEM PROBLEM. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-617 298

ILLINOIS UNIV URBANA

SYNTHESIS OF THREE-LEVEL LOGIC CIRCUITS WITH
APPLICATION TO A RADIX THREE COMPUTER ARITHMETIC
UNIT.

(U)

DESCRIPTIVE NOTE: MASTER'S THESIS,

MAY 65 61P ROZMARICH, THOMAS ALOIS :

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTER LOGIC, SYNTHESIS),
(*CIRCUITS, COMPUTER LOGIC), DIGITAL COMPUTERS,
SWITCHING CIRCUITS, DESIGN, CONTROL SEQUENCES

(U)

IT IS KNOWN THAT THE USE OF A LARGER RADIX IN A
DIGITAL COMPUTER WILL RESULT IN THE SPEEDING UP OF
ARITHMETIC OPERATIONS WHERE THE NUMBER OF RECURSIVE
STEPS IS REDUCED WITH A LARGER RADIX. ONE PROBLEM
ENCOUNTERED WHEN GOING TO HIGHER RADICES INVOLVES THE
VOLTAGE REPRESENTATION OF THE DIGITAL VALUES, WHICH
MAY LEAD TO THE NEED OF ADDITIONAL CIRCUITRY JUST TO
BE ABLE TO DISTINGUISH BETWEEN THE VARIOUS VOLTAGE
LEVELS. TERNARY LOGIC HAS BEEN SUGGESTED AS A
MEANS OF CONTROLLING TIMING IN SEQUENTIAL CIRCUITRY.
ADDER CIRCUITS ARE PRESENTED FOR USE IN A RADIX
THREE COMPUTER, AND, ALSO THREE LEVEL LOGIC
OPERATIONS WHICH HAVE A MORE GENERAL APPLICATION. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-619 894

CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
THE LOGICAL DESIGN OF A TRANSFER PATH FOR THE
VARIABLE STRUCTURE COMPUTER SYSTEM;

(U)

JUL 65 243P HOPKINS, DONN ARTHUR I

REPT. NO. 55-16

CONTRACT: NONR23352

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COUPLING CIRCUITS, COMPUTER
LOGIC), (*COMPUTER LOGIC, SYSTEMS ENGINEERING),
(*SYSTEMS ENGINEERING, COMPUTER LOGIC), (*DIGITAL
COMPUTERS, SYSTEMS ENGINEERING), DATA PROCESSING
SYSTEMS, DATA TRANSMISSION SYSTEMS, CONTROL
SEQUENCES, MULTIPLE OPERATION,
PROGRAMMING(COMPUTERS), GATES(CIRCUITS)
IDENTIFIERS: IBM 7094

(U)

(U)

THE TRANSFER PATH IS A BUFFER UNIT THAT WILL BE
USED TO DIRECT COUPLE AN IBM 7094 TO THE VARIABLE
STRUCTURE COMPUTER. IN ADDITION TO BUFFERING,
THE TRANSFER PATH, TP, ALLOWS THE VARIABLE
STRUCTURE COMPUTER, V, TO CONTROL THE RATE AND
DIRECTION OF 7094 COMPUTATION. TWO ONECYCLE
TRANSFERS EXECUTED BY THE 7094 ARE CONDITIONAL UPON
INFORMATION CONTAINED IN V. THE TP CAN
ELECTRONICALLY STOP OR START THE 7094 AT ANY TIME.
7094 TRAPS MAY BE INITIATED BY V THROUGH THE TP.
A NUMBER OF MODIFICATIONS TO 7094 LOGIC WERE
REQUIRED TO OBTAIN THE DESIRED OPERATION. A
DESCRIPTION OF THESE MODIFICATIONS HAS NOT BEEN
INCLUDED IN THIS REPORT. REFERENCE IS MADE TO THE
7094 LOGIC PAGES WHERE TP SIGNALS ARE INTRODUCED.
THE REPORT CONSISTS OF EIGHT CHAPTERS. CHAPTER
I IS AN INTRODUCTION TO THE VARIABLE STRUCTURE
COMPUTER AND A STATEMENT OF DESIGN OBJECTIVES.
CHAPTER II DESCRIBES WHAT THE TP DOES AND HOW
IT INTERACTS WITH THE 7094. CHAPTER III IS A
USER'S MANUAL FOR THE TP. CHAPTER IV CONCERNS
DATA TRANSMISSION RATES AND INCLUDES A DISCUSSION OF
7094 INSTRUCTION OVERLAP. CHAPTERS V THROUGH
VIII ARE A DESCRIPTION OF THE TP LOGIC. THE
MATERIAL INCLUDES A DESCRIPTION OF THE LOGICAL
ELEMENTS, A SET OF SEQUENCE AND TIMING CHARTS, A SET
OF LOGICAL EQUATIONS, IMPLEMENTED LOGIC DIAGRAMS, AND
A BRIEF DESCRIPTION OF THE PACKAGING. THE READER
MUST BE FAMILIAR WITH THE 7094 LOGIC BEFORE IT IS
POSSIBLE TO UNDERSTAND THE DETAILS OF THE TP LOGIC.
(AUTHOR)

(U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-621 976

NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
AN EXPERIMENTAL STUDY OF THE USES OF TERNARY LOGIC IN
DIGITAL COMPUTERS. (U)
DESCRIPTIVE NOTE: MASTER'S THESIS,
64 92P FRIICHTENICHT, RICHARD G. I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DIGITAL COMPUTERS, COMPUTER
LOGIC), (*COMPUTER LOGIC, DIGITAL COMPUTERS),
BINARY ARITHMETIC, GATES(CIRCUITS), SWITCHING
CIRCUITS, ALGEBRAS (U)
IDENTIFIERS: BINARY DIGITS, TERNARY SWITCHING
CIRCUITS, TRUTH TABLES (U)

DIGITAL COMPUTERS PRESENTLY IN PRODUCTION ARE ALL
BINARY LOGIC MACHINES, IN THAT THEY ARE BUILT WITH
ELEMENTS THAT HAVE TWO STABLE STATES. GREATER
EFFICIENCY IN COMPUTER SPEED AND HARDWARE WOULD BE
OBTAINED IF ELEMENTS WITH OTHER THAN TWO STATES WERE
USED. ATTEMPTS ARE NOW IN PROGRESS TO FIND DEVICES
THAT HAVE THIS PROPERTY. THE NEXT LOGICAL STEP
BEYOND BINARY WOULD BE TERNARY. A STUDY OF TERNARY
ALGEBRAS IS MADE WITH EMPHASIS ON COMPUTER
APPLICATIONS. FUNCTIONAL COMPLETENESS AND
EXPANSION THEOREMS ARE INTRODUCED TO SHOW THEIR
USEFULNESS IN COMPUTER DESIGN. AN ADDER CIRCUIT
USING THREE LEVEL LOGIC IS DESCRIBED AND A MEASURE OF
EFFECTIVENESS USING COST AND COMPLEXITY AS CRITERIA
IS MADE. IT CAN BE PREDICATED THAT, AS THE BINARY
COMPUTER APPROACHES ITS ULTIMATE IN SPEED, MORE
ATTENTION WILL BE PLACED ON N-VALUED LOGIC
MACHINES. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-643 178 9/2
STANFORD RESEARCH INST MENLO PARK CALIF
CELLULAR ARRAYS FOR LOGIC AND STORAGE. (U)
DESCRIPTIVE NOTE: FINAL REPT., 30 JUN 64-31 MAR 66,
APR 66 326P MINNICK, R. C. ISHORT, R. A. I
GOLDBERG, J. ISTONE, H. S. IGREEN, M. W. I
CONTRACT: AF 19(628)-4233
PROJ: SRI-5087 ,AF-4641
TASK: 464101
MONITOR: AFCRL 66-613

UNCLASSIFIED REPORT

DESCRIPTORS: (COMPUTER LOGIC, DESIGN),
(COMPUTER STORAGE DEVICES, DESIGN), MATHEMATICAL
ANALYSIS, CASCADE STRUCTURES, FUNCTIONS (U)
IDENTIFIERS: TURING MACHINE (U)

THE REPORT PRESENTS THE RESULTS OF A SECOND PROJECT
OF RESEARCH ON CELLULAR LOGIC. THE OBJECTIVE OF
THE RESEARCH HAS BEEN TO DEVELOP TECHNIQUES FOR THE
EFFICIENT REALIZATION OF GENERAL LOGICAL FUNCTIONS IN
MICROCELLULAR ARRAYS--I.E., CELLULAR ARRAYS IN WHICH
THE CELLS CONTAIN A SMALL NUMBER OF GATES. THE
REPORT IS IN SEVEN CHAPTERS. THE SUBJECTS OF THE
CHAPTERS ARE (I) INTRODUCTION, (II) ORGANIZATION
OF NEW CELLULAR ARRAYS, AND ANALYSIS OF FAULT
AVOIDANCE SCHEMES, (III) MATHEMATICAL ANALYSIS OF
CASCADES AND DERIVATION OF DECOMPOSITION ALGORITHMS,
(IV) TECHNIQUES FOR PRACTICAL LOGICAL DESIGN USING
CELLULAR ARRAYS, (V) A PROCEDURE FOR COMPUTER-AIDED
DESIGN OF CELLULAR ARRAYS, (VI) DESIGN OF A
CELLULARLY-ORGANIZED TURING MACHINE, AND (VII)
SUMMARY AND SUGGESTIONS FOR FURTHER WORK.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-649 413 9/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
METHOD OF ACCOMPLISHING LOGIC OPERATIONS WITH COMPLEX
SETS OF SYMBOLS, (U)
JAN 67 8P GUTENMAKHER, L. I. ;
REPT. NO. FTD-HY-67-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
PATENT (USSR) 151 882, APPL. 757936/26/24, 30 DEC
61.

DESCRIPTORS: (*COMPUTER LOGIC, *SWITCHING
CIRCUITS), COMPUTER STORAGE DEVICES, DATA
STORAGE SYSTEMS, DATA PROCESSING SYSTEMS,
SYMBOLS (U)

THE PAPER BRIEFLY DESCRIBES A FAST LOGIC CIRCUIT,
ACHIEVED BY CONNECTING THE LOGIC SWITCHES 'AND',
'OR' AND 'NOR', AND THE MEMORY COMPONENTS IN AN
N-DIMENSIONAL NETWORK OF A FREELY CHOSEN SYSTEM.
THE TYPICAL OPERATIONS QUOTED ARE: SURVEY AND
CALCULATIONS OF THREE DIMENSIONAL FIGURES,
DETERMINATION OF THE FIGURE CONTOURS, DETERMINATION
OF THE CURVES CREATED BY THE INTERSECTION OF TWO
DIFFERENT FIGURES AND SIMILAR. THE DIAGRAM WHICH
IS IN THE TEXT SHOWS ONLY A SIMPLIFIED OUTLINE OF
CONNECTIONS, ONLY THE JOINTS OF THE OUTER CELLS ARE
ILLUSTRATED. THE FIRST TWO MEMORY COMPONENTS (IN
SUB 1 AND N SUB 2) ACCEPT MEMORIZE THE BINARY SIGNS
'1' AND '0' FROM THE SIMILAR CELLS OF THE MEMORY
CIRCUIT. THE THIRD COMPONENT (IN SUB 3 ACCEPTS
AND MEMORIZES THE RESULT OF THE LOGIC OPERATION FROM
THE SWITCH (K) AND PASSES IT ACCORDING TO THE
COMMAND EITHER TO THE CELL OF THE MEMORY CIRCUIT OR
TO THE COMPONENT (IN SUB 2). THE ARRANGEMENT
CAN BE MADE FOUR- OR FIVE-DIMENSIONAL, USING VARIOUS
MAGNETIC, CAPACITIVE AND SEMICONDUCTOR COMPONENTS.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-654 401 9/2
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS
LAB
DREAC DRUM EXPERIMENTAL AUTOMATIC COMPUTER;
OPERATIONAL CHARACTERISTICS AND LOGICAL DESIGN, (U)
FEB 59 83P CARRUTH, DONALD E. ;
REPT. NO. CF-2782
CONTRACT: NORD-7386

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIGITAL COMPUTERS, COMPUTER
LOGIC), COMPUTER STORAGE DEVICES, CODING, REAL
TIME, SHIFT REGISTERS, INPUT-OUTPUT DEVICES,
DATA STORAGE SYSTEMS, DATA PROCESSING SYSTEMS (U)
IDENTIFIERS: DREAC (U)

THE REPORT COMPRISES 4 MAIN SECTIONS, LABELED:
(I) GENERAL INFORMATION; (II) OPERATIONAL
CHARACTERISTICS; (III) SPECIAL TOPICS; (IV)
LOGICAL DESIGN. SECTION (I) DESCRIBES THE
THEORY OF OPERATION AND THE NUMBER SYSTEM EMPLOYED.
IT ALSO GIVES DETAILS OF THE DRUM MEMORY AND THE
A/C SECTION. SECTION (II) GIVES A DETAILED
DESCRIPTION OF THE OPERATIONS PERFORMED DURING EACH
TYPE OF COMMAND. IT ALSO PRESENTS A MATHEMATICAL
OR SYMBOLIC DESCRIPTION OF THE OPERATION OF DREAC
IN ALL COMMANDS. SECTION (III) PRESENTS SPECIAL
INFORMATION OF THE TYPE NEEDED BY THE PROGRAMMER.
IT INCLUDES ROUNDING, REPRESENTATION OF ZERO,
OVERFLOW AND THE LIKE. SECTION (IV) IS THE BULK
OF THE REPORT. IT GIVES IN DETAIL THE LOGICAL
EQUATIONS WHICH DESCRIBE EXACTLY THE MODUS OPERANDI
OF DREAC. EXPLANATIONS ACCOMPANY THE EQUATIONS.
THE EXPLANATIONS ARE AIMED AT THE READER WITH MORE
THAN A CURSORY ACQUAINTANCE WITH LOGICAL DESIGN.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0443

AD-661 089 9/2 20/6
BOLT BERANEK AND NEWMAN INC CAMBRIDGE MASS
A QUANTUM OPTICAL PHENOMENON: IMPLICATIONS FOR
LOGIC.
DESCRIPTIVE NOTE: FINAL REPT. APR 64-MAR 66,
NOV 67 20P RING, E. M.; FOX, H. L.;
CLAPP, L. C.;
REPT. NO. BBN-1567
CONTRACT: NONR-4445(00)
TASK: NR-048-192/12-26-64

(U)

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN OPTICAL AND ELECTRO-
OPTICAL INFORMATION PROCESSING P31-43 1965.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BOSTON
UNIV., MASS.

DESCRIPTORS: (*COMPUTER LOGIC; OPTICAL
PHENOMENA); (*PUMPING(OPTICAL); RUBIDIUM);
ATOMIC ENERGY LEVELS; EXCITATION; PHOTONS;
ZEEMAN EFFECT; STARK EFFECT; MAGNETIC FIELDS;
RESONANCE; DATA PROCESSING SYSTEMS
IDENTIFIERS: OPTICAL COMPUTERS; DITHER EFFECT

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(U)

THERE ARE TWO APPROACHES THAT CAN BE TAKEN IN THE
SEARCH FOR NEW DEVICES AND TECHNIQUES FOR DIGITAL
INFORMATION PROCESSING. ONE APPROACH CONSISTS OF
HAVING AN 'A PRIORI' CONCEPTION OF A LOGIC STRUCTURE
FOR THE IMPLEMENTATION OF GENERAL LOGICAL STATEMENTS.
THE OTHER APPROACH IS TO EXAMINE APPROPRIATE
DEVICES AND PHYSICAL PROCESSES AND TO DETERMINE WHICH
LOGICAL STATEMENTS THEY MIGHT REPRESENT. THE FIRST
APPROACH IS THE MOST COMMON. IT IS USUAL TO REDUCE
ALL LOGICAL STATEMENTS TO BOOLEAN ALGEBRA AND THEN
TO SEEK DEVICES AND PHYSICAL PROCESSES WHICH WILL
PERFORM THE FUNCTION OF A BINARY 'STORE' OR 'NOR' OR
'AND', ETC. THIS MORE COMMON APPROACH HAS THE
OBVIOUS ADVANTAGE THAT ONE CAN CONCERN HIMSELF ONLY
WITH DEVICES AND NEED NOT CONSTRUCT A NEW ALGEBRA OF
LOGICAL STATEMENTS. HOWEVER, AS NEW PHYSICAL
PROCESSES AND RESULTANT DEVICES ARE EXPLORED, SUCH AN
APPROACH MAY RESULT IN AN INEFFICIENT UTILIZATION OF
THESE NEW TECHNIQUES. THE ALTERNATE APPROACH IS
EXPLORED IN THE PRESENT PAPER. WE EXAMINE A
PHYSICAL PROCESS WHICH WE BELIEVE HAS THE POTENTIAL
FOR HIGH-SPEED AND ACCURATE OPTICAL INFORMATION
PROCESSING. WE THEN EXAMINE SOME OF THE LOGICAL
FUNCTIONS SUCH A DEVICE COULD PERFORM. IN
INVESTIGATING THESE WE ATTEMPT TO AVOID ANY 'A
PRIORI' BIAS FOR THE REALIZATION OF BINARY LOGIC.
(AUTHOR)

(U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-665 332 9/2
MONTANA STATE UNIV BOZEMAN ELECTRONICS RESEARCH LAB
A CELLULAR COMPUTER ORGANIZATION FOR MATRIX
OPERATIONS, (U)
SEP 67 12P MINNICK, ROBERT C. ;
CANNON, LYNN E. ;
CONTRACT: M00014-67-C-0477
PROJ: ERL-R-0009-603

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIGITAL COMPUTERS, MATRIX
ALGEBRA), (*COMPUTER LOGIC, DESIGN), VECTOR
ANALYSIS, ALGORITHMS, COMPUTER STORAGE DEVICES,
CONTROL SEQUENCES, SPECIAL PURPOSE COMPUTERS (U)

THE DISCRETE KALMAN FILTER APPEARS TO BE A
NATURAL FORM FOR REALIZATION IN A SPECIALLY ORGANIZED
CELLULAR COMPUTER. A LARGE NUMBER OF VECTOR AND
MATRIX OPERATIONS IS REQUIRED, SUGGESTING THAT
EFFICIENCY IN SUCH OPERATIONS IS A KEY FACTOR IN
OVERALL MACHINE FUNCTION. THIS PAPER PRESENTS A
POSSIBLE STRUCTURE FOR A VECTOR AND MATRIX OPERATIONS
SUBSECTION OF SUCH A COMPUTER AND ILLUSTRATES
SPECIFICALLY MATRIX MULTIPLICATION BASED ON AN
ALGORITHM DEVISED BY THE AUTHOR. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0443

AD-668 085 9/2
STANFORD RESEARCH INST MENLO PARK CALIF POULTER LABS
PROPERTIES OF CELLULAR ARRAYS FOR LOGIC AND
STORAGE. (U)
DESCRIPTIVE NOTE: FINAL REPT. 14 JAN 66-13 OCT 67,
NOV 67 61P ELSPAS, BERNARD ;
KAUTZ, WILLIAM H. ; STONE, HAROLD S. ;
CONTRACT: AF 19(628)-5828
PROJ: AF-4641, SR1-5676
TASK: 464101
MONITOR: AFCL 68-0005

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMPUTER LOGIC, CIRCUITS),
COMPUTER STORAGE DEVICES, DIGITAL SYSTEMS,
NETWORKS, DETECTORS, MODULES(ELECTRONICS),
MANUFACTURING METHODS, MATHEMATICAL ANALYSIS,
TABLES (U)

THE REPORT PRESENTS FINAL RESULTS OF A THIRD
PROJECT COVERING RESEARCH ON CELLULAR LOGIC
TECHNIQUES. THE OBJECTIVE OF THE RESEARCH HAS BEEN
TO DEVELOP TECHNIQUES FOR THE EFFICIENT REALIZATION
OF GENERAL LOGICAL FUNCTIONS IN CELLULAR ARRAYS.
THE REPORT COVERS THE SUBJECTS OF CELLULAR CASCADES
AND RELATED NETWORKS; STUDIES OF UNIVERSAL LOGIC
MODULES; PROGRAMMED-LOGIC ARRAYS; DIAGNOSIS AND
TESTING OF CELLULAR ARRAYS; SAMPLED-SEQUENCE
DETECTORS, SERIAL UNIVERSAL LOGIC MODULES, AND
ITERATIVE MULTIRAIL CASCADES. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZA0463

AD-801 357 9/2 9/5
TEXAS UNIV AUSTIN LABS FOR ELECTRONICS AND RELATED
SCIENCE RESEARCH
AN ADAPTIVE THRESHOLD LOGIC GATE USING CAPACITIVE
ANALOG WEIGHTS. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 66 44P SMITH, JOHN R., JR.;
HARBOUR, CYRUS O.;
REPT. NO. TR-22
CONTRACT: AF-AFOSR-766-66
MONITOR: AFOSR 66-2532

UNCLASSIFIED REPORT

DESCRIPTORS: (*SWITCHING CIRCUITS, *COMPUTER
STORAGE DEVICES), (*LEARNING MACHINES, COMPUTER
LOGIC), ANALOG SYSTEMS, ADAPTIVE SYSTEMS,
INTEGRATED CIRCUITS, GATES(CIRCUITS). TRAINING
DEVICES (U)

A TRAINABLE ADAPTIVE THRESHOLD LOGIC GATE IS
DESCRIBED. A REVIEW OF BASIC THEORY OF THRESHOLD
LOGIC IS PRESENTED ALONG WITH A DESCRIPTION OF A
TRAINING TECHNIQUE. CAPACITORS CAPABLE OF
EXHIBITING LONG TERM ANALOG MEMORY ARE USED IN THE
PHYSICAL REALIZATION OF AN ADAPTIVE THRESHOLD LOGIC
GATE. A DESCRIPTION OF BOTH THE CAPACITIVE ANALOG
MEMORY AND THE TRAINABLE GATE IS GIVEN. TRAINING
RESULTS OF THE ADAPTIVE THRESHOLD DEVICE ARE
EXHIBITED FOR TEN DIFFERENT LINEARLY SEPARABLE
SWITCHING FUNCTIONS. SOME PRACTICAL DISCREPANCIES
BETWEEN IDEAL OPERATION AND CIRCUIT OPERATION ARE
DISCUSSED. SUGGESTIONS FOR FUTURE STUDIES AND
CIRCUIT IMPROVEMENTS ARE GIVEN. (AUTHOR) (U)

UNCLASSIFIED

BIOLOGICAL INFORMATION HANDLING

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-416 201

MELPAR INC FALLS CHURCH VA

A STUDY OF GENERALIZED MACHINE LEARNING.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT, FEB 62-JUNE 63,

AUG 63

228P

FUHR, WILLIAM H. J

CONTRACT: AF33 616 7682

PROJ: 4160

TASK: 416004

MONITOR: ASD TOR63 714

UNCLASSIFIED REPORT

DESCRIPTORS: (•TEACHING MACHINES, BIONICS),
(•IONICS, ANALYSIS), (•COMPUTERS, ARTIFICIAL
INTELLIGENCE), EFFECTIVENESS, CYBERNETICS,
TEST METHODS, COMPUTER LOGIC, PERCEPTION,
SENSORY MECHANISM, NERVE CELLS, PSYCHOLOGY,
SIMULATION, MAN, VISION, VISUAL ACUITY.

(U)

IDENTIFIERS: MARKOV PROCESS, SOBLN (SELF-ORGA
NIZING BINARY LOGICAL NETWORK), MAZE
VEHICLE, 1963.

(U)

THE TRAINING PROCESS HAS BEEN ANALYZED AS A
MARKOV PROCESS IN A FINITE STATE MACHINE. A
VECTOR REPRESENTATION OF MACHINE INPUTS AND OUTPUTS
IS DEVELOPED AND A METHOD OF DETERMINING THE TRANSI
TION MATRIX USING THIS REPRESENTATION IS PRE SENDED.
METHODS ARE PRESENTED FOR CALCULATING THE MEAN
LEARNING TIME FROM THE TRANSITION MATRIX. USING
CHARACTERISTICS OF THE TRANSITION MATRIX, A THEOREM
IS PROVED WHICH ESTABLISHES THE CRITERION FOR A
STATIONARY PROBABILITY DISTRIBUTION OF STATES. A
METHOD IS ALSO PRESENTED FOR REDUCING THE SIZE OF A
TRANSITION MATRIX BY COMBINING EQUIVALENT STATES.
CRITERIA FOR IDENTIFYING EQUIVALENT STATES ARE
DEFINED. THE TRAINING PROCESS IS INVESTIGATED WITH
BOTH STATIONARY AND NON-STATIONARY ENVIRONMENTS.
WITH THE STATIONARY ENVIRONMENT ATTENTION IS
FOCUSED ON STABILITY AND ORGANIZABILITY REQUIREMENTS
IN THE TRAINING PROCESS. AN ALGEBRAIC FORMULATION
OF MACHINE-ENVIRONMENT INTERACTION IN A NON-
STATIONARY ENVIRONMENT IS ALSO PRESENTED. NUMEROUS
EXAMPLES OF TRAINING WITH DIFFERENT TYPES OF BUILDING
BLOCKS AND DIFFERENT GOAL CRITERIA ARE PROVIDED AND
VARIOUS BUILDING BLOCKS ARE EVALUATED AS TO THEIR EF
FICIENCY IN FORMING LOGICAL CONNECTIVES. SIMULA
TION OF HUMAN DEPTH PERCEPTION USING SIZE AND RETINAL
DISPARITY CUES DEMONSTRATED THE ABILITY OF THE
NETWORK TO ORGANIZE SO AS TO MAKE OPTIMAL USE OF
AVAILABLE INFORMATION. (AUTHOR)

(U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0443

AD-435 982

AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO
1963 BIONICS SYMPOSIUM 19-20-21 MARCH, INFORMATION
PROCESSING BY LIVING ORGANISMS AND MACHINES. (U)

MAR 64 360P

REPT. NO. ASD-TDR-63-946

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BIONICS, SYMPOSIA), (*SYMPOSIA,
BIONICS), (*ARTIFICIAL INTELLIGENCE, MEDICAL
RESEARCH), NETWORK, MODELS (SIMULATIONS), NERVE CELLS,
NERVOUS SYSTEM, MATHEMATICAL MODELS, COLOR VISION,
AUDITORY PERCEPTION, LEARNING, DATA PROCESSING
SYSTEMS, BEHAVIOR, TRAINING DEVICES, CYBERNETICS,
COMPUTERS, COMMUNICATION THEORY, MATHEMATICAL LOGIC (U)
IDENTIFIERS: 1963 (U)

THIS REPORT COMPILES PAPERS PRESENTED IN THE
INVITED SESSIONS AT THE BIONICS SYMPOSIUM 1963
HELD 19-21 MARCH 1963 AT DAYTON, OHIO. THESE
SESSIONS ARE DEVOTED TO THE SUBJECT INFORMATION
PROCESSING BY LIVING ORGANISMS AND MACHINES
AND HAVE THE FOLLOWING TITLES: I. GENERAL
SESSIONS; II. SIGNAL RECEPTION BY LIVING
ORGANISMS; III. INFORMATION PROCESSING BY
LIVING ORGANISMS; IV. PHYSICAL PRINCIPLES OF
BIONICS; AND V. APPLICATION OF BIONIC
CONCEPTS. BIOLOGICAL, MATHEMATICAL, AND
ENGINEERING PAPERS ARE EQUALLY REPRESENTED ATTACKING
THE PROBLEM OF UNDERSTANDING AND SIMULATING THE
SOPHISTICATED INFORMATION PROCESSING CAPABILITIES OF
LIVING ORGANISMS BY ARTIFICIAL MEANS. (AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z80463

AD-602 073

RAND CORP SANTA MONICA CALIF

A DIGITAL-COMPUTER MODEL OF NERVE-CELL
FUNCTIONING.

(U)

JUN 64

49P

PERKEL, DONALD H. ;

REPT. NO. RM-4132NH

CONTRACT: PHS GM09608 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*NERVE CELLS, BIONICS), (*MATHEMATICAL
MODELS, NERVE CELLS), (*BIONICS, NERVE CELLS),
CYBERNETICS, PROGRAMMING (COMPUTERS), DIGITAL
COMPUTERS, SIMULATION, NERVOUS SYSTEM, CELLS
(BIOLOGY), CYTOLOGY

(U)

A MATHEMATICAL MODEL OF NERVE-CELL FUNCTIONING IS
DESCRIBED. THIS MODEL IS EMBODIED IN DIGITAL-
COMPUTER PROGRAMS WHICH SIMULATE THE BEHAVIOR OF
NERVE CELLS, THEIR INTERCONNECTING FIBERS, AND
EXTRINSIC SOURCES OF IMPULSES. THE SIMULATION
UTILIZES A CONTINUOUS TIME PARAMETER.

INVESTIGATIONS USING THIS MODEL HAVE BEEN CONDUCTED
IN CLOSE COLLABORATION WITH EXPERIMENTAL
NEUROPHYSIOLOGISTS. THE PHYSIOLOGICAL CONTENT OF
THE MODEL IS DISCUSSED BY TRACING A NERVE IMPULSE AS
IT IS CONDUCTED ALONG AN AXON, AND AS IT OCCASIONS
THE RELEASE OF A TRANSMITTER SUBSTANCE AT A SYNAPSE,
INTERACTS WITH THE TRANSMEMBRANE POTENTIAL OF THE
POSTSYNAPTIC CELL, UNDERGOES SPATIAL AND TEMPORAL
INTEGRATION WITH OTHER POSTSYNAPTIC POTENTIALS, AND
POSSIBLY CONTRIBUTES TO THE FIRING OF THE CELL, WHICH
UNDERGOES ABSOLUTE AND RELATIVE REFRACTORY PERIODS,
AND PROPAGATES AN IMPULSE ALONG ITS OWN AXON.

(AUTHOR)

(U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z80463

AD-602 966

RCA LABS PRINCETON N J

TWO-MODE THRESHOLD LEARNING.

(U)

DESCRIPTIVE NOTE: REPT. FOR MAY-OCT 63.

MAY 64 64P OKLANSKY, J. J.

CONTRACT: AF33 657 11336

PROJ: 7233

TASK: 723305

MONITOR: AMRL ,

TDR64 39

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MATHEMATICA MODELS, BIONICS),
(*TRAINING, MATHEMATICAL MODELS), (*STOCHASTIC
PROCESSES, FEEDBACK), (*BIONICS, BEHAVIOR), ADAPTATION
(PHYSIOLOGY), CYBERNETICS, PATTERN RECOGNITION,
RETRAINING, COMPUTERS, CONTROL, ADJUSTMENT
(PSYCHOLOGY), SENSORY PERCEPTION, SIMULATION,
ENVIRONMENT, LEARNING

(U)

IN CERTAIN 'THRESHOLD LEARNING PROCESSES'
(TLPs) ASSOCIATED WITH PATTERN RECOGNITION AND
SENSORY PERCEPTION, THE PROCESS OF TRAINING AN
OBSERVER TO RECOGNIZE PATTERNS OR DISTINGUISH LEVELS
OF SENSORY EXCITATION MAY BE MODELED BY A FINITE-
STATE MARKOV CHAIN. THE STATISTICS OF THE
SIGNALS RECEIVED BY THE OBSERVER MOVE AT RANDOM
BETWEEN TWO SETS OF PARAMETERS IN A 'TWO-MODE' TLP,
MODELED BY A TWO-MODE MARKOV CHAIN. USING A
PROBABILISTIC MEASURE OF EFFECTIVENESS, THE
EFFECTIVENESS OF A 'SIMPLE INCREMENTAL' FEEDBACK
POLICY IS SHOWN TO BE GREATER FOR TWO-MODE TLPs
THAN FOR ONE-MODE TLPs OVER A CERTAIN RANGE OF
ENVIRONMENTAL AND STRUCTURAL STATISTICS. A METHOD
OF DESIGNING PERIODIC TRAIN-WORK SCHEDULES FOR TWO-
MODE TLPs IS DESCRIBED. ('TRAIN' AND 'WORK'
CORRESPOND TO 'CLOSED-LOOP' AND 'OPEN-LOOP'
RESPECTIVELY.) IN MANY REAL ADAPTIVE PROCESSES AN
'RC APPROXIMATION' OF THE TRAIN-WORK DYNAMICS IS
APPLICABLE. FOR THESE PROCESSES THE RATIO OF
WORKING TIME TO RETRAINING TIME, YIELDING A DESIRED
PERFORMANCE LEVEL, IS MAXIMIZED WHEN THE WORK-RETRAIN
PERIOD IS MADE AS SMALL AS POSSIBLE. MANY
STOCHASTIC PROCESSES PRESENT MODELING PROBLEMS OF
NEAR PSYCHOLOGICAL COMPLEXITY. WAYS IN WHICH OPEN-
LOOP/CLOSED-LOOP RELATIONSHIPS CAN HELP THE LIFE
SCIENTIST OR ENGINEER MODEL ADAPTIVE STOCHASTIC
PROCESSES BY TWO-MODE TLPs ARE INDICATED.

(AUTHOR:

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-608 284
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
ON THE STRUCTURE AND ORGANIZATION OF THE NERVOUS
SYSTEM FROM AN INFORMATION PROCESSING POINT OF VIEW
(NEURAL CODING, VISION, AND MOTORCONTROL). (U)
DESCRIPTIVE NOTE: FINAL REPT. FOR OCT 62-MAR 64.
OCT 64 106P COULTER, N. A., JR.:
CONTRACT: AF33 657 9660
PROJ: 7233
TASK: 723304
MONITOR: AMRL , TR64 80

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CENTRAL NERVOUS SYSTEM, BIONICS),
(*BIONICS, CENTRAL NERVOUS SYSTEM), (*DATA PROCESSING
SYSTEMS, BIONICS), NERVE CELLS, PHYSIOLOGY, VISUAL
SIGNALS, VISUAL PERCEPTION, COLORS, IMAGES, FOCUSING,
INTENSITY, SPACE PERCEPTION, STABILIZATION,
SERVOMECHANICS, NEUROMUSCULAR TRANSMISSION, CEREBRAL
CORTEX, CEREBELLUM, BRAIN, RETINA, BIOPHYSICS,
CYBERNETICS, POSTURE, PROBABILITY, DIFFERENTIAL
EQUATIONS (U)
IDENTIFIERS: ELECTROPHYSIOLOGY (U)

A STUDY WAS MADE OF THE CENTRAL NERVOUS SYSTEM FROM
AN INFORMATION PROCESSING POINT OF VIEW. THE STUDY
ENTAILED A REVIEW AND CRITICAL ANALYSIS OF SEVERAL
HUNDRED REFERENCES, AND INVOLVED A CONSIDERABLE
AMOUNT OF RECASTING AND REORGANIZATION OF EXISTING
KNOWLEDGE INTO THE TERMS AND CONCEPTS OF ENGINEERING,
WITH PARTICULAR REFERENCE TO POTENTIAL BIONIC
APPLICATIONS. THE STUDY WAS SELECTIVE RATHER THAN
COMPREHENSIVE. THE NEURAL CODING PROBLEM WAS FIRST
EXAMINED. THE HISTORY OF EFFORTS DEALING WITH THIS
PROBLEM WAS REVIEWED, AND A MATHEMATICAL
REPRESENTATION OF NEURAL SIGNALS (NEUROGRAMS) AND
NEURAL OPERATORS WAS FORMULATED. THE PROCESSING OF
DATA BY THE VISUAL SYSTEM WAS THEN DESCRIBED, WITH
PARTICULAR REFERENCE TO FORM, COLOR, AND MOVEMENT
DETECTION, THE TEMPORAL CONTINUITY OF VISUAL OBJECTS,
IMAGE FIXATION, AUTOMATIC FOCUSING CONTROL,
INTENSITY CONTROL, IMAGE FUSION, DEPTH PERCEPTION,
AND THE STABILIZATION OF VISUAL SPACE. NEXT, THE
NEURAL CONTROL OF MOVEMENT WAS ANALYZED FROM A
SERVOMECHANICAL VIEWPOINT. THE UNIT BIOMECHANICAL
CONTROL SYSTEM WAS DEFINED, AND THE CORTICOSPINAL
COMMAND OF THIS UNIT SYSTEM WAS DISCUSSED. THE
CEREBELLAR COORDINATION AND EXTRAPYRAMIDAL
STABILIZATION OF SEQUENCES AND COMBINATIONS OF (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB04,3

AD-610 580

RAND CORP SANTA MONICA CALIF

A DEFENSE OF NEURAL MODELLING,

JAN 65

10P

PERKEL, DONALD H. ;

MOORE, GEORGE P. ;

REPT. NO. P-3057

(U)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE CYBERNETIC SCIENCES SYMPOSIUM (2ND), THE LOS ANGELES INVITATIONAL ON BIOPHYSICS, HELD ON 13 OCT 64, AT THE UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.

DESCRIPTORS: (•BIONICS, NERVOUS SYSTEM), (•NERVOUS SYSTEM, MODELS (SIMULATIONS)), CYBERNETICS, PROGRAMMING (COMPUTERS), DIGITAL COMPUTERS, PHYSIOLOGY, SYMPOSIA

(U)

AT THE SECOND CYBERNETIC SCIENCES SYMPOSIUM, HELD ON 13 OCTOBER, 1964, THE SPECIFIC UTILITY OF NEURAL MODELLING TO THE EXPERIMENTAL RESEARCH WORKER WAS QUESTIONED BY DR. LOUIS FEIN, OF PALO ALTO, CALIFORNIA. DR. FEIN'S WRITTEN COMMENTARY AND THE AUTHORS' RESPONSE ARE PRESENTED HERE IN THE BELIEF THAT THIS EXCHANGE HAS IMPLICATIONS BEYOND NEUROPHYSIOLOGY, EXTENDING TO THE CONSTRUCTION OF COMPUTER MODELS OF BIOLOGICAL AND OTHER COMPLEX SYSTEMS.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-613 430

PHILCO CORP WILLOW GROVE PA BIO-CYBERNETICS LAB
A CORRELATIONAL STUDY OF MYOPOTENTIAL RESPONSE AND
FORCE OF MUSCLE CONTRACTION DURING VARYING ACTIVITY
DEMANDS. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,

MAR 65 32P FINLEY, F. RAY ; WIRTA, ROY

W. I

REPT. NO. 2386

CONTRACT: NONR429200

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BIONICS, MUSCLES), (*MUSCLES,
ELECTRICAL PROPERTIES), CONTRACTION, PERFORMANCE
(HUMAN), COMPUTERS, SIGNALS, MOTION, CYBERNETICS,
CONTROL SYSTEMS, POTENTIOMETERS, ERGOMETERS,
TACHOMETERS, ELECTRONIC RECORDING SYSTEMS,
RELIABILITY, FORCE (MECHANICS), PROGRAMMING
(COMPUTERS) (U)

IDENTIFIERS: MYOPOTENTIAL RESPONSE, MYOELECTRIC
ACTIVITY, MYOCODERS (U)

A MAJOR OBJECTIVE OF THE PHILCO BIO-
CYBERNETICS ENGINEERING ACTIVITY HAS BEEN TO
DEVELOP AN OPTIMUM DEGREE OF COMPATIBILITY BETWEEN
MAN AND THE MACHINES WHICH HE USED TO AUGMENT HIS
PERFORMANCE CAPACITY. ONE PHASE OF STUDY, IN THE
PURSUIT OF THIS OBJECTIVE, HAS BEEN DEVELOPED ABOUT A
HYPOTHESIS THAT THE MYOELECTRIC ACTIVITY ASSOCIATED
WITH MUSCULAR CONTRACTION COULD BE UTILIZED TO
CONTROL A POWERED EXO-SKELETAL SYSTEM DESIGNED TO
AMPLIFY ONE'S STRENGTH. THIS PHASE OF STUDY IS THE
SUBJECT OF THIS INTERIM REPORT. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-619 704

RAND CORP SANTA MONICA CALIF

EXAMPLE OF A LARGE-MODEL SIMULATION OF THE BLOOD
BIOCHEMICAL SYSTEM, (U)

AUG 65 33P MALONEY, JAMES V. , JR. ;

DEHAVEN, JAMES C. ; DELAND, EDWARD C. ;

BRADHAM, GILBERT B. ;

REPT. NO. P-3194

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED FOR PUBLICATION IN A
SYMPOSIUM ISSUE OF THE JOURNAL OF CHRONIC DISEASES.

DESCRIPTORS: (*BLOOD CHEMISTRY, MATHEMATICAL
MODELS); (*BIONICS, BLOOD CHEMISTRY); COMPUTERS,
SIMULATION, PROGRAMMING (COMPUTERS),
RESPIRATORY SYSTEM, CHEMICAL REACTIONS, BLOOD
PLASMA, ERYTHROCYTES, STRESS (PHYSIOLOGY),
METABOLIC DISEASES, ACIDOSIS, HYPOTHERMIA,
HEMATOCRIT, HEMOGLOBIN, SYMPOSIA (U)

THE PAPER OUTLINES A FORMAL PROCEDURE FOR
SIMULATING CERTAIN ASPECTS OF THE BIOCHEMISTRY OF A
VIABLE SYSTEM. THE PROCEDURE IS BASED ON A
MATHEMATICAL MODEL AND A COMPUTER PROGRAM. THE
PLAUSIBILITY OF CONSTRUCTING DETAILED MODELS OF LARGE
BIOCHEMICAL SYSTEMS IS DEMONSTRATED. THE OBJECT OF
THE PAPER IS TO DEMONSTRATE THAT A MATHEMATICAL
PROGRAM CAN SIMULATE THE FUNCTIONS OF A SELECTED
VIABLE SYSTEM. FOR THIS PURPOSE, A MATHEMATICAL
MODEL OF VIABLE BLOOD KNOWN AS THE 'SF BLOOD' MODEL
WAS CHOSEN. THE 'SF BLOOD' MODEL IS A REASONABLE
REPRESENTATION OF THE RESPIRATORY FUNCTION OF THE
ADULT-RESTING MALE BLOOD. (U)

UNCLASSIFIED

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DLC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-622 685

PURDUE UNIV LAFAYETTE IND

THE STUTTERING PROBLEM CONSIDERED FROM AN AUTOMATIC
CONTROL POINT OF VIEW. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS.

JAN 65 126P BUTLER, BLAINE R., JR.:

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•VERBAL BEHAVIOR, BIONICS),

(•BIONICS, VERBAL BEHAVIOR), (•SPEECH,

BIONICS), (•CYBERNETICS, VERBAL BEHAVIOR),

PSYCHOPHYSIOLOGY, ANOMALIES, SIMULATION,

MATHEMATICAL MODELS, COMPUTERS, THERAPY,

BIOPHYSICS, APPLIED PSYCHOLOGY (U)

IDENTIFIERS: STUTTERING (U)

THIS STUDY INVESTIGATES THE STUTTERING PROBLEM FROM
AN AUTOMATIC CONTROL POINT OF VIEW. IN ORDER TO
ACCOMPLISH THIS, IT WAS FIRST NECESSARY TO BUILD A
MATHEMATICAL MODEL OF THE SPEECH SYSTEM. THIS
MODEL WAS BASED ON A FAIRBANKS MODEL. AS A FIRST
APPROXIMATION, EXTREME SIMPLIFICATIONS WERE MADE
WHICH IGNORED THE TACTILE AND PROPRIOCEPTIVE FEEDBACK
LOOPS AND ASSUMED LINEARITY OF THE VOCAL TRACT AND
EAR IN THE NORMAL RANGE OF OPERATION. THIS
ESSENTIALLY REDUCED THE MODEL TO A NON-LINEAR SYSTEM
COMPOSED OF NUMEROUS TIME DELAYS AND VARIABLE GAINS.

VARIOUS INSTABILITIES IN THE SYSTEM WERE THEN
CONSIDERED AND THEIR VALIDITY IN THE STUTTERING
PROBLEM TESTED. THIS WAS ACCOMPLISHED BY APPLYING
CLINICALLY TESTED TECHNIQUES, WHICH DECREASE OR STOP
STUTTERING IN PEOPLE, TO THE MATHEMATICAL MODEL.
THE ASSUMPTION WAS THAT IF THE TECHNIQUES WHICH
DECREASE OR STOP STUTTERING IN PEOPLE ALSO RETURNED
THE MODEL TO A STABLE STATE, OR NORMAL SPEECH, THEN
THIS MODEL INSTABILITY WAS POSSIBLE CAUSE OF
STUTTERING. THE VARIOUS THEORIES OF STUTTERING,
THE SOCIOGENIC, PSYCHOGENIC, PHYSIOGENIC AND
LEARNING THEORIES, WERE USED WHEN POSSIBLE TO GUIDE
THE ANALYSIS. THIS LED TO THE CONCLUSION THAT A
MALFUNCTION OF THE MIDDLE EAR, A VARIABLE GAIN
DEVICE, WAS POSSIBLE CAUSE OF STUTTERING.

(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB04A3

AD-635 391 6/4

MELPAR INC FALLS CHURCH VA
ELECTRONIC SIMULATION OF THE DYNAMICS OF EVOLVING
BIOLOGICAL SYSTEMS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.

MAY 66 127P JUSTICE, KEITH E. ;

CONNELLY, EDWARD M. IGERVINSKI, JUDY M. ;

CONTRACT: AF 33(615)-2456.

PROJ: AF-4160,

TASK: 416004,

MONITOR: AFAL TR-66-151

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BIONICS, GENETICS), (*GENETICS,
MATHEMATICAL MODELS), PHYSIOLOGY, SIMULATION,
ADAPTATION(PHYSIOLOGY), MONTE CARLO METHOD,
SURVIVAL, REPRODUCTION(PHYSIOLOGY), MUTATIONS,
DIGITAL COMPUTERS, ANALOG SYSTEMS, OPTIMIZATION,
PROBABILITY, MICE (U)

A BIONIC INVESTIGATION AND MODELING OF ORGANIC
EVOLUTION IS DESCRIBED. THE PROJECT WAS UNDERTAKEN
TO PROVIDE A DEEPER UNDERSTANDING OF THE ADAPTIVE
PROCESSES INVOLVED IN ORGANIC EVOLUTION. OF
PARTICULAR INTEREST WAS A COMPARISON OF SELF-
ORGANIZING PROCESSES IN EVOLUTIONARY SYSTEMS AND
ANALOGOUS PROCESSES IN TRAINABLE LOGICAL NETWORKS.
THE BIOLOGICAL PROTOTYPE FOR THE MODEL IS THE PERA
HOUSE MOUSE (MUS MUSCULUS) AS IT EXISTS IN SEMI-
ISOLATED POPULATIONS IN THE SOUTHWESTERN UNITED
STATES. SPECIAL EMPHASIS IS GIVEN TO A BALANCED
LETHAL GENETIC SYSTEM KNOWN TO EXIST IN THE SPECIES.
USING MONTE CARLO TECHNIQUES, THE MODEL
SIMULATES, FOR EACH INDIVIDUAL, SUCH EVENTS AS THE
PROBABILITY OF SURVIVAL, MIGRATION, MATING,
REPRODUCTION, MUTATION, GENETIC SEGREGATION, AND
NATURAL SELECTION. IMPLEMENTATION OF THE MODEL ON
A DIGITAL COMPUTER IS DESCRIBED. RESULTS OF
EXPERIMENTS PERFORMED WITH THE MODEL SHOW THAT THE
MODEL BEHAVES IN A MANNER HIGHLY ANALOGOUS TO BOTH
THE BIOLOGICAL PROTOTYPE AND TO CERTAIN ASPECTS OF
TRAINABLE LOGICAL NETWORKS. IMPLICATIONS AND
THEORETICAL INVESTIGATIONS OF THE WORK FOR FUTURE
DEVELOPMENTS IN MACHINE INTELLIGENCE ARE DISCUSSED.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-640 248 6/4 9/2
RAND CORP SANTA MONICA CALIF
A DIGITAL-COMPUTER MODEL OF SPIKE ELICITATION BY
POSTSYNAPTIC POTENTIALS IN SINGLE NERVE CELLS, (U)
SEP 66 42P MACGREGOR, R. J. ;
REPT. NO. RM-4877-ARPA,
CONTRACT: SD-79, ARPA ORDER-189-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•BIONICS, NERVE CELLS), (•NERVE
CELLS, MODELS(SIMULATIONS)), NERVE IMPULSES,
PHYSIOLOGY, NERVOUS SYSTEM, ELECTROPHYSIOLOGY,
MATHEMATICAL MODELS, DIGITAL COMPUTERS,
BIOPHYSICS (U)

A SIMULATION OF THE INFORMATION-PROCESSING FUNCTION
OF NERVE CELLS IS PRESENTED. THE COMPUTER MODEL
SIMULATES THE PORTION OF THE NEURON AT WHICH SPIKE
POTENTIALS ARE INITIATED. VALUES FOR PARAMETERS
WERE SPECIFIED ON THE BASIS OF NEUROELECTRIC
RECORDINGS SO THAT THE RESULTS OBTAINED MIGHT BE
PERTINENT TO ACTUAL NERVE CELLS. TRIAL RUNS VERIFY
THAT THE MODEL IS ACCURATELY REPRODUCING THE
FUNCTIONAL FORMS OF NEUROELECTRIC DATA. INPUT-
OUTPUT RELATIONS UNDER REGULAR INPUT ARE GIVEN FOR A
WIDE RANGE OF INPUT FREQUENCY AND PULSE AMPLITUDE.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0423

AD-645 499 6/4 9/2
BELL AEROSYSTEMS CO BUFFALO N Y
NONLINEAR PREPROCESSING OF INPUTS TO LINEAR NEURAL
NETS, (U)
OCT 66 55P GOERNER, JOHANNES G. ;
GERHARDT, L. A. ; POWELL, F. D. ;
REPT. NO. 9500-920059
CONTRACT: AF 49(638)-1627
PROJ: AF-9769
TASK: 976904
MONITOR: AFOSR 67-0054

UNCLASSIFIED REPORT

DESCRIPTORS: (CYBERNETICS, DATA PROCESSING
SYSTEMS), NONLINEAR SYSTEMS, INPUT-OUTPUT
DEVICES, ADAPTIVE SYSTEMS, ANALOG SYSTEMS,
CODING, LEARNING MACHINES, PROCESSING,
NETWORKS (U)

DISCRIMINATION OF ANALOG SIGNAL PATTERNS BY LINEAR
SINGLE-GAIN LAYER NETS CAN BE SIGNIFICANTLY IMPROVED
BY FEEDING THE ANALOG SIGNALS INTO PREPROCESSORS THAT
CONVERT EACH ANALOG SIGNAL TO A BINARY SIGNAL WITH M
BITS, THUS INCREASING THE NUMBER OF GAIN ELEMENTS
FROM N TO NM. THE NUMBER OF INPUT VECTORS TO WHICH
AN ARBITRARILY DESIRED NET OUTPUT CAN BE ASSIGNED
INCREASES CORRESPONDINGLY FROM N TO NM. THIS
RESULT HOLDS FOR ANY BINARY CONVERTER WITH WORD
LENGTH M INDEPENDENT OF THE CODE OF THE CONVERTER.
THE NUMBER INCREASES FURTHER WITH THE RADIX Q IF A
Q-ARY PREPROCESSOR IS EMPLOYED. THE COMMON
QUANTIZER SHOWS PARTICULAR MERITS FOR PRACTICAL
APPLICATIONS AS ONLY ONE OUTPUT LINE IN ANY QUANTIZER
IS ACTIVE, THUS ALLOWING GAIN ADJUSTMENTS INDEPENDENT
OF EACH OTHER WITHIN EACH QUANTIZER. THE
COMBINATION OF QUANTIZER AND LINEAR NET IS REPORTED
ON IN DETAIL. WITH A FORCED LEARNING-TYPE TRAINING
ALGORITHM, FINAL GAIN VALUES ARE SHOWN TO REPRESENT
THE DIFFERENCE OF THE CONDITIONAL PROBABILITIES OF
THE INPUT PATTERN CLASSES. THE COMBINATION OF
QUANTIZER AND LINEAR NET INSTRUMENTS A TYPE OF
LIKELIHOOD RATIO, WITH AN ERROR-CORRECTING
TRAINING ALGORITHM, THE FINAL GAINS FORM A GAIN
VECTOR SUCH THAT THE ERROR WITH RESPECT TO THE
DESIRED OUTPUT FOR EACH CLASS BECOMES MINIMIZED IN
THE LEAST MEAN SQUARE SENSE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z60463

AD-646 115 6/2

OSLO UNIV (NORWAY) NEUROPHYSIOLOGICAL LAB
RHYTHMIC ACTIVITY IN A SIMULATED NEURONAL
NETWORK.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,

JAN 66 13P ANDERSEN, P. GILLON, M. I

RUDJORD, T. I

CONTRACT: AF-EDAR-10-65

PROJ: AF-9777

TASK: 977701

MONITOR: AFOSR 67-0207

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN J. PHYSIOL. V185 P418-28
1966.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BERGEN
UNIV. (NORWAY). DEPT. OF GEOPHYSICS.

DESCRIPTORS: (•BIONICS, •NERVOUS SYSTEM), NERVE
CELLS, DIGITAL COMPUTERS, PROBABILITY, NERVE
IMPULSES, ELECTROPHYSIOLOGY, THALAMUS,
RHYTHM(BIOLOGY), COMPUTER PROGRAMS,
SIMULATION

(U)

AN IMMEDIATE FINDING IN THE COMPUTER WRITE-OUT WAS
A GREAT TENDENCY TO INITIAL RHYTHMICITY. ALTHOUGH
THIS MIMICS THE RHYTHMIC ACTIVITY THAT CAN BE SEEN IN
THE ANIMAL THALAMUS IN RESPONSE TO A SINGLE,
SYNCHRONOUS AFFERENT NERVE VOLLEY, THE RESULTS CAN
NOT BE TAKEN AS INDICATING THAT THE NETWORK IS
OPERATING AS THE ANIMAL THALAMUS. WITH THE PROGRAM
USED IN THE PRESENT SERIES OF EXPERIMENTS, THE START
OF THE COMPUTER IS COMPARABLE TO THE DISCHARGE OF A
GREAT NUMBER OF CELLS OF THE NETWORK.
CONSEQUENTLY, MANY CELLS ARE IN A STATE OF
INCREASED PROBABILITY OF DISCHARGE (PD) AFTER THE
INHIBITORY PERIOD THAT FOLLOWS THE INITIAL DISCHARGE.
THEREFORE, THE FIRST FEW PERIODS OF RHYTHMIC
DISCHARGE ARE NOT MORE THAN CAN BE ANTICIPATED.
THESE RESULTS NEITHER SUPPORT NOR CONTRADICT THE
THEORY ADVANCED FOR THE OCCURRENCE OF THE INITIAL
BURST DISCHARGES IN THE THALAMUS (ANDERSEN AND
ECCLES, 1962). MORE INTERESTING RESULTS WERE
OBTAINED FROM ANALYSIS OF THE FLUCTUATIONS OF THE
DISCHARGES AFTER THE INITIAL TRANSIENT RESPONSE OF
THE SYSTEM. AFTER A STAGE OF ALMOST RANDOM
ACTIVITY, THERE OCCURRED PERIODS OF RHYTHMIC
ACTIVITY, APPARENTLY SPONTANEOUS. THESE PERIODS
BOTH STARTED AND ENDED GRADUALLY, VERY SIMILAR TO
THOSE PERIODS OF SPONTANEOUS ACTIVITY THAT CAN BE
RECORDED FROM THE ANIMAL AND HUMAN THALAMUS AND
CEREBRAL CORTEX. THUS, A SIMULATED NETWORK, WITH

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 280463

AD-646 441 9/2 6/4
SYSTEMS RESEARCH LABS INC DAYTON OHIO
INFORMATION HANDLING PROPERTIES OF NEUROMIME
NETS. (U)
DESCRIPTIVE NOTE: FINAL REPT. 15 MAY 64-31 MAY 65
SEP 66 17P COLOMB, ROBERT M. ;
CONTRACT: AF 33(615)-1,975
PROJ: AF-7233
TASK: 723302
MONITOR: AMRL TR-66-128

UNCLASSIFIED REPORT

DESCRIPTORS: (*DATA PROCESSING SYSTEMS,
*BIONICS), (*ARTIFICIAL INTELLIGENCE, PATTERN
RECOGNITION), MATHEMATICAL MODELS, LEARNING
MACHINES, INSTRUCTION MANUALS,
PROGRAMMING (COMPUTERS) (U)
IDENTIFIERS: NEUROMIME NETWORKS (U)

THE REPORT IS A STUDY ON SOME ELEMENTARY
INFORMATION HANDLING PROPERTIES OF NEUROMIME NETS,
GIVING MOST EMPHASIS TO THE FUNCTIONING OF A SINGLE
NEUROMIME COMPONENT, AND CONTAINING SOME DISCUSSION
OF THE OPERATION OF SIMPLE NETS. SINGLE COMPONENT
COMPUTATION IS TREATED FROM THE POINT OF VIEW OF
CHANGES BROUGHT ABOUT IN THE INTERNAL STRUCTURE BY
OPERATIONS PERFORMED DURING DATA FLOW. A
GEOMETRICAL MODEL IS PRESENTED WHICH ILLUSTRATES THE
PATTERN MEASUREMENT BEHAVIOR OF THE COMPONENT, AND
SOME OF THE SIMPLER DIFFERENTIAL EQUATIONS OF
ADAPTATION ARE SOLVED TO PROVIDE SOME INSIGHT INTO
THE EFFECT AND INTERACTION OF THE COMPONENT CONTROL
PARAMETERS. SIMPLE NET BEHAVIOR IS CONCERNED
MAINLY WITH FEEDBACK INTERACTION AMONG COMPONENTS,
AND GIVES SOME USEFUL NOTATION FOR DESCRIBING NET
OPERATION. (AUTHOR) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 280463

AD-650 132 67
RAND CORP SANTA MONICA CALIF
MATHEMATICAL ANALYSIS AND DIGITAL SIMULATION OF THE
RESPIRATORY CONTROL SYSTEM, (U)
MAR 67 54P BROOKS, FRED S. ;
BUELL, JOE E BART, ALFRED J. ;
REPT. NO. RM-6544-PR
CONTRACT: F44-62-1-04-004

UNCLASSIFIED REPORT

DESCRIPTORS: (1) RESPIRATORY SYSTEM, (2) RESPIRATORY SYSTEM, MATHEMATICAL MODELS, LUNGS, BLOOD, TISSUE, GASES, TRANSPORT PROPERTIES, DIFFERENCE EQUATIONS, DIFFERENTIAL EQUATIONS, ACID-BASE EQUILIBRIUM, BLOOD CIRCULATION, CONTROL SYSTEMS, CHEMORECEPTORS, COMPUTER PROGRAMS, DIGITAL COMPUTERS, RESPONSES, CARBON DIOXIDE, HYPOXIA, METABOLIC DISTURBANCES, DYNAMICS, COMPUTER LOGIC (U)

THE REPORT DEPENDS UPON BASIC MATERIAL BALANCE RELATIONSHIPS FOR THE LUNG-BLOOD-TISSUE GAS TRANSPORT AND EXCHANGE SYSTEM AND UPON A SET OF DIFFERENTIAL-DIFFERENCE EQUATIONS, AND UPON A NUMBER OF DEPENDENT TIME DELAYS. ADDITIONAL EQUATIONS DEFINE THE CHEMICAL DETAILS OF TRANSPORT AND ACID-BASE BUFFERING, CONCENTRATION EQUILIBRIA, AND BLOOD FLOW BEHAVIOR. FINALLY, A CONTROL FUNCTION IS INCLUDED DEFINING THE LEVEL OF VENTILATION UPON CSF PH AND ARTERIAL PH AND PO2 AT THE CAROTID RECEPTORS. A COMPUTER PROGRAM WAS WRITTEN FOR DIGITAL SIMULATION OF THE RESPONSES OF THE SYSTEM TO A WIDE VARIETY OF FORCING, INCLUDING HYPOXIA, HYPOXIA AT SEA LEVEL, ALTITUDE HYPOXIA, AND METABOLIC DISTURBANCES IN ACID-BASE BALANCE. BOTH DYNAMIC AND STEADY-STATE BEHAVIOR OF THE SYSTEM WERE REASONABLY REALISTICALLY REPRODUCED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z804 3

AD-650 346 6/4 6/2
RAND CORP SANTA MONICA CALIF
NEURONAL SPIKE TRAINS AND STOCHASTIC POINT
PROCESSES. (U)
DESCRIPTIVE NOTE: MEMORANDUM REPT.,
MAR 67 145P PERKEL, DONALD M. ;
GERSTEIN, GEORGE L. ; MOORE, GEORGE P. ;
REPT. NO. RM-4816-PR
CONTRACT: F44620-67-C-0045, NSF-C21497

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN BIOPHYSICAL JOURNAL,
V7 N4 145P (JUL 1967).
SUPPLEMENTARY NOTE: RESEARCH SUPPORTED IN PART BY
NIH.

DESCRIPTORS: (*BIONICS, NERVOUS SYSTEM),
(*NERVE CELLS, NERVE IMPULSES), (*NERVE
IMPULSES, MODELS(SIMULATIONS)), MATHEMATICAL
MODELS, STATISTICAL ANALYSIS, PHYSIOLOGY,
BIOPHYSICS, STATISTICAL PROCESSES, STOCHASTIC
PROCESSES, PROBABILITY, COMPUTERS, STIMULATION (U)
IDENTIFIERS: BIOENGINEERING (U)

THE MATHEMATICAL THEORY OF STOCHASTIC POINT
PROCESSES IN ITS PROBABILISTIC AND STATISTICAL
ASPECTS IS APPLIED TO NERVE IMPULSE SEQUENCES.
MATHEMATICAL RESULTS ARE EXTENDED AND ILLUSTRATED
THROUGH THE APPLICATION OF STATISTICAL TECHNIQUES TO
THE RESULTS OF COMPUTER EXPERIMENTS ON SIMULATED
NERVE CELLS. STATISTICAL TECHNIQUES AT SEVERAL
LEVELS OF COMPLEXITY ARE USED IN THE ANALYSIS OF
SINGLE STATIONARY SPIKE TRAINS. A SET OF
TECHNIQUES IS PRESENTED FOR ANALYZING TWO SPIKE
TRAINS SIMULTANEOUSLY IN THE PRESENCE AND ABSENCE OF
STIMULATION. IT IS SHOWN HOW TO TEST FOR
INDEPENDENCE OF THE TWO CELLS AND TO DIAGNOSE THE
SOURCES OF DEPENDENCE WHEN FOUND. THE EFFECTS OF
TRENDS IN THE DATA ON THE COMPUTATIONAL RESULTS ARE
DISCUSSED AND ILLUSTRATED. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-650 567 6/4
SERVICE BUREAU CORP NEW YORK
NEUROMIME NETWORK SIMULATOR. APPENDIX II. NEUROMIME
SIMULATOR OUTPUT. (U)
DESCRIPTIVE NOTE: FINAL REPT., 19 MAR 63-15 APR 66,
SEP 66 378P FLAUGHER, JAMES I
CONTRACT: AF 33(657)-11194
PROJ: AF-7233
TASK: 723304
MONITOR: AMRL TR-66-101-VOL-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-650 576, VOLUME I.
REPORT ON BIOLOGICAL INFORMATION HANDLING SYSTEMS
AND THEIR FUNCTIONAL ANALOGS.

DESCRIPTORS: (•BIONICS, NERVOUS SYSTEM),
DIGITAL COMPUTERS, SIMULATION, NERVE CELLS,
PROGRAMMING LANGUAGES, COMPUTER PROGRAMS (U)

BECAUSE OF THE LARGE NUMBER OF NETWORK COMBINATIONS
AND PARAMETER VARIATIONS POSSIBLE IN A STEELE
NEUROMIME NETWORK, A PROGRAM FOR SIMULATING THE NETS
ON A DIGITAL COMPUTER IS BEING DEVELOPED TO AID IN
DETERMINING THE MOST EFFICIENT NETS FOR SPECIFIC
TASKS. THE RESULTS OF THE INVESTIGATION OF NETWORK
AND PARAMETER VARIATIONS MAY THEN BE USED AS THE
RESTRAINTS AND DESIGN CRITERIA FOR NEUROMIME DEVICES
WITH SPECIFIC SIGNAL RECOGNITION CAPABILITIES. THE
SIMULATION PROVIDES AS A TOOL, A MEANS OF GENERATING
RANDOMLY CONNECTED NETWORKS WITH DESIRED STATISTICAL
RESTRAINTS AND A TRAINING PHASE WHICH ALTERS THE
NETWORK IN SUCH A MANNER AS TO FORCE THE ACTUAL
RESPONSE CLOSER TO THE DESIRED RESPONSE. THE
GENERALIZED NATURE OF THE NETS USED IS THE ESSENCE OF
THE RESEARCH EFFORT. APPENDIX II CONTAINS THE
NEUROMIME SIMULATOR OUTPUT. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z80463

AD-650 576 6/4
SERVICE BUREAU CORP NEW YORK
NEUROMIME NETWORK SIMULATOR. (U)
DESCRIPTIVE NOTE: FINAL REPT., 19 MAR 63-15 APR 66,
SEP 66 137P FLAUGHER, JAMES I
CONTRACT: AF 33(657)-11194
PROJ: AF-7233
TASK: 723304
MONITOR: AMRL TR-66-101-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON PROJECT BIOLOGICAL
INFORMATION HANDLING SYSTEMS AND THEIR FUNCTIONAL
ANALOGS. SEE ALSO AD-650 567, VOLUME 11.

DESCRIPTORS: (•BIONICS, NERVOUS SYSTEM),
DIGITAL COMPUTERS, SIMULATION, NERVE CELLS,
PROGRAMMING LANGUAGES, COMPUTER PROGRAMS (U)

BECAUSE OF THE LARGE NUMBER OF NETWORK COMBINATIONS
AND PARAMETER VARIATIONS POSSIBLE IN A STEELE
NEUROMIME NETWORK, A PROGRAM FOR SIMULATING THE NETS
ON A DIGITAL COMPUTER IS BEING DEVELOPED TO AID IN
DETERMINING THE MOST EFFICIENT NETS FOR SPECIFIC
TASKS. THE RESULTS OF THE INVESTIGATION OF NETWORK
AND PARAMETER VARIATIONS MAY THEN BE USED AS THE
RESTRAINTS AND DESIGN CRITERIA FOR NEUROMIME DEVICES
WITH SPECIFIC SIGNAL RECOGNITION CAPABILITIES. THE
SIMULATION PROVIDES AS A TOOL, A MEANS OF GENERATING
RANDOMLY CONNECTED NETWORKS WITH DESIRED STATISTICAL
RESTRAINTS AND A TRAINING PHASE WHICH ALTERS THE
NETWORK IN SUCH A MANNER AS TO FORCE THE ACTUAL
RESPONSE CLOSER TO THE DESIRED RESPONSE. THE
GENERALIZED NATURE OF THE NETS USED IS THE ESSENCE OF
THE RESEARCH EFFORT. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB0463

AD-653 446 9/2 6/4
NAVAL ORDNANCE LAB WHITE OAK MD
COMPUTING, THINKING, AND DYNAMICS, (U)
DEC 66 36P THICKSTUN, W. R. ;
REPT. NO. NOLTR-67-54, MATHEMATICS DEPT-M-66

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMPUTERS, MATHEMATICAL MODELS),
(*BIONICS, THEORY), INFORMATION THEORY,
REASONING, DYNAMICS, NUMERICAL METHODS AND
PROCEDURES, ALGORITHMS (U)

A HEURISTIC DISCUSSION IS PRESENTED OF THE GENERAL
PROBLEM OF COMPUTING AS IT IN FACT IS USUALLY
PERFORMED. THE DISCUSSION HAS IMPORTANT
IMPLICATIONS FOR THE PROCESS OF CONSTRUCTING
MATHEMATICAL MODELS. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZB04,3

AD-663 722 6/4
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF
ENGINEERING
DIGITAL COMPUTER SIMULATION OF VISUAL INFORMATION
PROCESSING IN THE HUMAN BRAIN. (U)
DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 67 152P HILLSMAN, WILLIAM CLARKE ;
REPT. NO. GA/EE/67-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*PATTERN RECOGNITION, DIGITAL
COMPUTERS), (*BIONICS, *VISUAL PERCEPTION),
SIMULATION, BRAIN, VISION, COMPUTER PROGRAMS,
MODELS(SIMULATIONS), THESES (U)
IDENTIFIERS: INFORMATION
PROCESSING(PSYCHOLOGY), IBM 7094 (U)

A VISUAL INFORMATION PROCESSING SYSTEM, BASED ON
SELECTED ASPECTS OF HUMAN PHYSIOLOGY, IS SIMULATED ON
THE IBM 7094 DIGITAL COMPUTER THROUGH THE USE OF
OVER 50 TEST PATTERNS. MONOCHROMATIC TEST
PATTERNS, REPRESENTED BY UP TO 2500 RESOLVABLE
ELEMENTS WITHIN A 50X50 ARRAY, ARE USED TO SIMULATE
STATIC, FOVEAL, MONOCULAR VISION. PATTERNS ARE
COMPARED AFTER SCALING, ROTATION, AND TRANSLATION.
THE TECHNIQUE USED FOR COMPARISON WHICH RESEMBLES
THE WELL KNOWN CROSS-CORRELATION TECHNIQUE, IS BASED
UPON THE ABSOLUTE-MAGNITUDE-OF-THE-DIFFERENCE OF TWO
FUNCTIONS; AN ALGORITHM IS USED FOR SCALING AND
ROTATION. SIMILAR AND IDENTICAL PATTERNS ARE
IDENTIFIED BY MEANS OF EMPIRICALLY DERIVED
DISCRIMINATION THRESHOLDS. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z80463

AD-667 809 6/4 9/2
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO
INFORMATION PROCESSING IN SMALL SYNCODER
NETWORKS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS.
SEP 67 37P GRUENKE, ROGER ALLAN ;
REPT. NO. AMRL-TR-67-104
PROJ: 7233
TASK: 723303

UNCLASSIFIED REPORT

DESCRIPTORS: (•BIONICS, CONTROL SYSTEMS),
(•NERVE CELLS, MODELS(SIMULATIONS));
NONLINEAR SYSTEMS, DATA PROCESSING SYSTEMS,
PULSE SYSTEMS, NETWORKS, COMPUTER PROGRAMS,
RESPONSE, THESES (U)
IDENTIFIERS: SYNCODERS (U)

A SYNCODER IS AN ELECTRONIC MODEL OF SOME OF THE
INFORMATION PROCESSING PROPERTIES OF NERVE CELLS.
THE OPERATION OF A SINGLE SYNCODER NEAR THRESHOLD
IS INVESTIGATED FOR TRANSIENT PULSE-PAIR INPUTS.
THE RESULTS OBTAINED FROM THIS STIMULUS ARE
PRESENTED IN GRAPHICAL FORM AND A NOTATION WHICH IS
USEFUL FOR DESCRIBING NETWORK INTERCONNECTIONS IS
PROPOSED. INVESTIGATION OF SOME OF THE ALGEBRAIC
PROPERTIES OF SYNCODER NETWORKS SHOWS THE SYNCODING
OPERATION NEAR THRESHOLD TO BE NONCOMMUTATIVE,
NONASSOCIATIVE, AND NONDISTRIBUTIVE, AS WELL AS
NONLINEAR. AN APPENDIX CONTAINS A COMPLETE CIRCUIT
DESCRIPTION OF A SINGLE SYNCODER. (AUTHOR) (U)

UNCLASSIFIED

HUMAN FACTOR INFORMATION HANDLING

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-262 119

HUMAN FACTORS RESEARCH INC LOS ANGELES CALIF

HUMAN INFORMATION TRANSMISSION AS A FUNCTION OF

SELECTED VISUAL AND AUDITORY STIMULUS DIMENSIONS (U)

JUL 61

IV

BUCKNER, DONALD N.; HARABEDIAN, ALBERT

CONTRACT: NONR245300

UNCLASSIFIED REPORT

DESCRIPTORS: •COMMUNICATION SYSTEMS, •COMMUNICATION
THEORY, •HUMAN ENGINEERING DATA PROCESSING SYSTEMS,
DATA TRANSMISSION SYSTEMS, HEARING, REACTION
(PSYCHOLOGY), SENSORY MECHANISMS, STIMULATION, TESTS,
THRESHOLDS (PHYSIOLOGY) (U)

UNCLASSIFIED

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 200463

AD-262 481

AMELCO INC LOS ANGELES CALIF

DATA PROCESSING, THE EXTENSION OF MAN'S SENSORS AND
PHYSICAL CAPABILITIES. ANIP RESEARCH

(U)

JUN 61 IV

UNCLASSIFIED REPORT

DESCRIPTORS: *DATA PROCESSING SYSTEMS, *HUMAN
ENGINEERING, COMPUTERS, DIGITAL SYSTEMS, ELECTRONICS,
EQUATIONS, INSTRUMENTATION

(U)

CONTENTS: DATA PROCESSING WHAT IS DATA
PROCESSING DERIVATION OF ENERGY-INFORMATION
RELATION THE OVER-ALL SYSTEM THE DATA
PROCESSING SYSTEM REMARKS CONCERNING FUNCTION
GENERATORS SYSTEM BLOCK DIAGRAM A METHODOLOGY
FOR EVALUATING DATA PROCESSING SYSTEMS
INFORMATION FLOW VS CLOCK RATE INFORMATION
CHANNEL CAPACITY ANALYSIS OF SOME EXISTING
SYSTEMS OTHER PARAMETERS MICROELECTRONICS
SUMMARY OF MICROELECTRONICS TO DATE PHASE I--
APPLICATION TO PRODUCTION: THE FUNCTIONAL
ARRAY

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-283 330

SMITH ELECTRONICS INC CLEVELAND OHIO
DESIGN AND USE OF MAN-MACHINE SYSTEMS

(U)

IV

MILLER, ROBERT B.; CHAPMAN, ROBERT L.;

CONTRACT: NONR-135408

UNCLASSIFIED REPORT

DESCRIPTORS: •ARMED FORCES RESEARCH, •AUTOMATION,
•HUMAN ENGINEERING, •MILITARY RESEARCH, ARMED FORCES
BUDGETS, COMMUNICATION THEORY, COMPUTERS, DECISION
MAKING, DEPARTMENT OF DEFENSE, DISPLAY SYSTEMS,
DOCUMENTATION, INFORMATION RETRIEVAL, LANGUAGE,
MANAGEMENT ENGINEERING, PERSONNEL, RESEARCH PROGRAM
ADMINISTRATION, SIMULATION, WEAPONS (U)

PROBLEMS IN BASIC RESEARCH THAT NEED TO BE SOLVED
IN ORDER TO MAKE THE MOST EFFECTIVE USE OF MEN IN
WEAPON SYSTEMS ARE DISCUSSED. DISCUSSION IS
LIMITED TO TOPICS IN WHICH PRESENT RESEARCH SUPPORT
APPEARS TO BE INADEQUATE TO MEET THE NEEDS OF THE
DEPARTMENT OF DEFENSE IN THE TIME PERIOD 1965-
70, AND TO THOSE TOPICS IN WHICH THE DEPARTMENT OF
DEFENSE HAS A PECULIAR INTEREST BECAUSE OF ITS
GENERALITY. BASIC SCIENTIFIC THEORY ON SYSTEMS
CONSIDERED AS A WHOLE IS INADEQUATE. SYSTEM
SIMULATION TECHNIQUES ARE INADEQUATE. CURRENT
TECHNIQUES FOR PERSONNEL OPERATIONS ARE INADEQUATE TO
INSURE THAT NEW MAN-MACHINE SYSTEMS WILL BE
EFFECTIVELY OPERATED, MAINTAINED AND SUPPORTED. A
GENERALIZED MAN-TO-MACHINE CONTROL LANGUAGE IS NEEDED.
KNOWLEDGE OF DISPLAYS IS INADEQUATE BOTH IN TERMS
OF WHAT INFORMATION TO DISPLAY AND HOW BEST TO
DISPLAY IT. METHODS OF INDEXING RESEARCH DATA AND
INFORMATION FOR EFFICIENT USE OF MECHANIZED STORAGE
AND RETRIEVAL SYSTEMS ARE INADEQUATE. A FOCUS IS
NEEDED FOR THE PRESENT WIDELY SCATTERED MAN-MACHINE
SYSTEM RESEARCH ACTIVITIES. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-288 832

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

OBSERVING HOW HUMANS MAKE MISTAKES TO DISCOVER HOW TO
GET COMPUTERS TO DO LIKEWISE (U)

JUN 62 IV TRAVIS, L.E.

REPT. NO. SP 776

UNCLASSIFIED REPORT

DESCRIPTORS: CYBERNETICS, ANALYSIS, ARTIFICIAL
INTELLIGENCE, COMPUTERS, ERRORS, MAN, REASONING (U)

OBSERVING HOW HUMANS MAKE MISTAKES TO DISCOVER HOW TO GET
COMPUTERS TO DO LIKEWISE. TECHNIQUES IN ANALYSIS OF
PROBLEM SOLVING, WITH EXAMPLES.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZCC4,3

AD-402 145

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

A STUDY IN PROBABILISTIC INFORMATION PROCESSING

(PIP)

(U)

APR. 63

IV

KAPLAN, RICHARD J. INEWMAN, ROBERT J.

REPT. NO. TM1150-247-00

CONTRACT: AF19 628 1644

UNCLASSIFIED REPORT

DESCRIPTORS: *DECISION MAKING, *STATISTICAL ANALYSIS,
COMPUTERS, DATA PROCESSING SYSTEMS, GAME THEORY, HUMAN
ENGINEERING, PROBABILITY (U)

A STUDY IN PROBABILISTIC INFORMATION PROCESSING (PIP).

UNCLASSIFIED

AL-447-718

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

A METHODOLOGICAL APPROACH TO THE ANALYSIS AND
AUTOMATIC HANDLING OF TASK INFORMATION FOR SYSTEMS IN
THE CONCEPTUAL PHASE, (U)

AUG 63 120P REED, LAWRENCE E.:

FOLEY, JOHN P.; GRAHAM, RALPH S.:

HILGEMAN, JONATHAN B.:

PROJ: 1710

TASK: 171006

MONITOR: AMRL TDR63 78

UNCLASSIFIED REPORT

DESCRIPTORS: (*JOB ANALYSIS, SCIENTIFIC RE
SEARCH), DATA PROCESSING SYSTEMS, HUMAN ENG!
NEERING, BEHAVIOR, CODING, TRAINING PERSONNEL,
INFORMATION RETRIEVAL. (U)

IDENTIFIERS: HUMAN FACTORS, SYSTEMS ANALYSIS,
1963. (U)

ADEQUATE CONSIDERATION OF THE HUMAN SKILLS RE
QUIRED BY FUTURE SYSTEMS HAS LONG BEEN NEGLECTED IN
THE CONCEPTUAL PHASE OF MAN-MACHINE SYSTEM
DEVELOPMENT. THIS NEGLECT IN PART HAS BEEN DUE TO
LACK OF A UNIFORM AND WORKABLE METHOD FOR GATHERING,
PROCESSING, AND USING EARLY HUMAN FACTORS
INFORMATION FOR IMPROVING THE DESIGN AND DEVELOPMENT
OF SYSTEMS. THE METHODOLOGICAL APPROACH PRESENTED
IN THIS REPORT WAS PREDICATED ON THIS NEED. THIS
REPORT PRESENTS A TECHNIQUE FOR ANALYZING AND
PROCESSING TASK AND TASK REQUIREMENTS DATA GENERATED
DURING THE CONCEPTUAL PHASE OF SYSTEM DEVELOPMENT.
THE TECHNIQUE INCLUDES: (A) A CATEGORY SYSTEM
FOR ORGANIZING, CLASSIFYING, AND CODING TASK
INFORMATION; (B) A TASK ANALYSIS FORMAT FOR
RECORDING AND CODING TASK DESCRIPTIONS AND TASK
REQUIREMENTS; AND (C) COMPUTER UPDATE AND
RETRIEVAL PROGRAMS. TASK REQUIREMENT DATA
APPEARING IN DOCUMENTS RESULTING FROM THE AIR
FORCE STUDY REQUIREMENT PROGRAM ARE ANALYZED
AND USED FOR TESTING THE TECHNIQUE ON AN ACTUAL
PERSONNEL TRAINING PROBLEM. THE TEST PROGRAM
INDICATES THAT THE TECHNIQUE CAN BE USED TO ASSIST
HUMAN FACTORS SPECIALISTS TO ISOLATE AND PROCESS TASK
AND TASK REQUIREMENTS ASSOCIATED WITH ADVANCED
SYSTEMS FOR MAKING PERSONNEL, TRAINING, AND TRAINING
EQUIPMENT RECOMMENDATIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC04A3

AD-424 284

BOLT BERANEK AND NEWMAN INC CAMBRIDGE MASS
THE SYSTEM SYSTEM AND BRIDGES OVER THE GULF BETWEEN
MAN-MACHINE-SYSTEM RESEARCH AND MAN-MACHINE-SYSTEM
DEVELOPMENT, (U)

JAN 62 30P LICKLIDER, J. C. R. :

CONTRACT: AF49 638 355

MONITOR: AFOSR 1673

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*OPERATIONS RESEARCH, COMPUTERS),
(*HUMAN ENGINEERING, DESIGN), COMPUTERS, SCIENTIFIC
RESEARCH, COMMUNICATION THEORY, MODELS (SIMULATIONS),
OPERATION, MATHEMATICAL MODELS (U)

IDENTIFIERS: 1962, MAN-MACHINE SYSTEM, SYSTEM
ANALYSIS. PERT, SAGE, TIROS, MIDAS (U)

THE NEED FOR GREATER COHERENCE IN THE MANMACHINE
AND OTHER HIGH-ORDER INTERACTIONS OF OUR MAJOR
SYSTEMS IS DESCRIBED, AND AN APPROACH TO ACHIEVEMENT
OF THAT COHERENCE IS PROPOSED. THE APPROACH
INVOLVES A COMPUTER-CENTERED META-SYSTEM (THE
'SYSTEM SYSTEM') DESIGNED TO FACILITATE
COMMUNICATION, COORDINATION, AND PROBLEM-SOLVING.
THE NEEDS FOR, AND ROLES OF, SUCH A META-SYSTEM IN
VARIOUS PHASES OF SYSTEM DESIGN, DEVELOPMENT,
PRODUCTION, AND OPERATION ARE DISCUSSED.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-430 412

MASSACHUSETTS UNIV AMHERST

INFORMATION PROCESSING UNDER TASK STRESS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

NOV 63 54P TEICHNER, WARREN H. I

CONTRACT: AF19 628 290

PROJ: 7682

TASK: 768201

MONITOR: ESD TDR63 657

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON MAN COMPUTER
INFORMATION PROCESSING.

DESCRIPTORS: (*DATA PROCESSING SYSTEMS, MANNED),
(*PERSONNEL MANAGEMENT, DATA PROCESSING SYSTEMS),
(*JOB ANALYSIS, DATA PROCESSING SYSTEMS), OPERATION,
INPUT-OUTPUT DEVICES, OPERATOR (PERSONNEL), STRESS
(PSYCHOLOGY), MEMORY, ANALYSIS OF VARIANCE,
EXPERIMENTAL DATA, TABLES, DATA, COMMUNICATION THEORY (U)
IDENTIFIERS: INFORMATIONAL INPUT, SUBJECTIVE
INFORMATION, HUMAN INFORMATION PROCESSING, SYSTEM
VARIABLES (U)

THIS IS THE FINAL REPORT OF STUDIES OF HUMAN
INFORMATION PROCESSING RELATED TO VARIABLES PRESENT
IN HIGH SPEED SYSTEMS OPERATIONS. THIS REPORT
REVIEWS EARLIER REPORTED DATA PERTINENT TO THE
EFFECTS OF INFORMATIONAL INPUT RATES AND RELATED
FACTORS. THE REPORT THEN PRESENTS EXPERIMENTS
CONCERNED WITH TWO OTHER ASPECTS OF THE PROBLEM:
(1) THE INTERACTION OF SHORT-AND LONG-TERM
MEMORIES IN HUMAN DATA HANDLING, AND (2) THE
EFFECTS OF PRESENTED INFORMATION RATES ON SUBJECTIVE
INFORMATION, I.E., THE AMOUNT OF INFORMATION IN THE
OPERATOR'S ESTIMATE OF WHAT IS PRESENTED BY THE
DISPLAY. (AUTHOR)

(U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0443

AD-483 974 5/9
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONICS
PERSONNEL RESEARCH GROUP
POTENTIAL USES OF COMPUTERS AS TEACHING
MACHINES, (U)
OCT 61 26P RIGNEY, JOSEPH W. :

UNCLASSIFIED REPORT

DESCRIPTORS: (DIGITAL COMPUTERS, TEACHING
MACHINES), FEASIBILITY STUDIES, HUMAN
ENGINEERING, PERFORMANCE(HUMAN), MAN-MACHINE
SYSTEMS, ACHIEVEMENT TESTS, APPLIED PSYCHOLOGY,
EDUCATION (U)

THE USE OF INTERACTIVE CAPACITY TO DEAL WITH
INDIVIDUAL DIFFERENCES IN LEARNING HAS POTENTIALITIES
IN AT LEAST THREE TYPES OF LEARNING ENVIRONMENTS.
HOWEVER, ITS APPLICATION TO THIS PROBLEM IN ANY OF
THESE ENVIRONMENTS IS IN RELATIVELY CRUDE STAGES.
ALTHOUGH NOT TECHNOLOGICALLY IMPOSSIBLE TO
IMPLEMENT, DEVELOPING MAN-COMPUTER INTERACTIONS WHICH
WILL ADJUST THE PRESENTATION OF THE MATERIAL TO BE
LEARNED TO INDIVIDUAL CAPABILITIES AND REQUIREMENTS
DEPENDS UPON A SUITABLE BACKGROUND OF PSYCHOLOGICAL
INFORMATION FOR GUIDANCE. AT THE PRESENT TIME,
THERE APPEARS TO BE A GREAT DEAL OF THIS INFORMATION
THAT IS SUGGESTIVE OF DIRECTIONS TO TAKE, AND OF
PROBLEMS THAT WILL ARISE. HOWEVER, IT IS LIKELY
THAT INVESTIGATORS TRYING TO USE THIS NEW TOOL FOR
THIS PURPOSE WILL HAVE TO DEVELOP THEIR OWN SPECIFIC
METHODOLOGY AND THEIR OWN FUND OF RESEARCH EXPERIENCE
WITHIN THE BROADER CONTEXT OF TRADITIONAL STUDIES OF
INDIVIDUAL DIFFERENCES IN LEARNING. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-486 382 5/5
NEW YORK UNIV N Y DEPT OF INDUSTRIAL ENGINEERING AND
OPERATIONS RESEARCH
FACTORS AFFECTING INFORMATION STORAGE AND RETRIEVAL
IN MAN. (U)
DESCRIPTIVE NOTE: FINAL REPT. SEP 63-JUN 66,
JUN 66 19P MAYZNER, MARK S. ;
CONTRACT: NONR-285(56)
PROJ: NR-196-027

UNCLASSIFIED REPT

DESCRIPTORS: (*DATA STORAGE SYSTEMS, HUMAN
ENGINEERING), (*INFORMATION RETRIEVAL, HUMAN
ENGINEERING), HUMANS, DECISION MAKING, COMMAND
+ CONTROL SYSTEMS, DATA PROCESSING SYSTEMS,
OPERATORS(PERSONNEL), DESIGN, DISPLAY SYSTEMS,
CODING, RECALL, PERFORMANCE(HUMAN),
MATHEMATICAL MODELS, RETENTION, INPUT-OUTPUT
DEVICES (U)

THIS FINAL REPORT DISCUSSES IN SOME DETAIL THE
MAJOR RESULTS OF SOME 14 STUDIES THAT EXAMINED THE
EFFECTS OF FOUR PARAMETERS NAMELY, (1) CODING
OF INFORMATION, (2) ORGANIZATION OF
INFORMATION, (3) AMOUNT OF INFORMATION, AND
(4) DISPLAY TIME, ON INFORMATION STORAGE AND
RETRIEVAL CAPACITY IN MAN. FIVE STUDIES DEALT
SPECIFICALLY WITH CODING, THREE STUDIES DEALT
SPECIFICALLY WITH ORGANIZATION, TWO STUDIES DEALT
SPECIFICALLY WITH AMOUNT, AND FOUR STUDIES DEALT
SPECIFICALLY WITH DISPLAY TIME. THE RESULTS OF ALL
14 STUDIES WERE RELATED TO A VARIETY OF DISPLAY
DESIGN PROBLEMS IN MILITARY *COMMAND AND CONTROL*
SYSTEMS AND A NUMBER OF SPECIFIC DISPLAY DESIGN
RECOMMENDATIONS ARE OFFERED BASED ON THE RESEARCH
FINDINGS. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-601 075

RAND CORP SANTA MONICA CALIF

COMPUTER SIMULATION OF HUMAN BEHAVIOR

(U)

MAY 64 15P FEIGENBAUM, E. A. I

REPT. NO. 2905

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BEHAVIOR, SIMULATION), *DIGITAL
COMPUTERS, HUMANS, LEARNING, COMPUTER LOGIC,
PROGRAMMING LANGUAGES, PROGRAMMING (COMPUTERS), MODELS
(SIMULATIONS), VERBAL BEHAVIOR (U)

BASED ON A SURVEY OF THE LITERATURE, THE DIGITAL
COMPUTER AS A SIMULATOR OF HUMAN BEHAVIOR IS
DISCUSSED UNDER THE FOLLOWING TOPICS: (1)
COMPUTERS AS INFORMATION PROCESSORS, (2)
HUMAN INFORMATION PROCESSING, (3) INFORMATION
PROCESSING THEORY AND COMPUTER SIMULATION, (4)
COMPUTER SIMULATION WITHIN EXISTING FRAMEWORKS,
(5) NEW INFORMATION PROCESSING MODELS. (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-602 041

BIO-DYNAMICS INC CAMBRIDGE MASS

DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED
ON-THE-JOB TRAINING, I. CONCEPTUAL AND EXPERIMENTAL
APPROACHES,

(U)

DEC 63 105P

SHERIDAN, THOMAS B. ;

MAYER, SYLVIA R. ;

CONTRACT: AF19 629 455

PROJ: 7682

TASK: 768204

MONITOR: ESD TDR64 234

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMMAND AND CONTROL SYSTEMS, TRAINING
DEVICES), (*TRAINING DEVICES), BEHAVIOR, DECISION
MAKING, TRAINING, LEARNING, EDUCATION, DISPLAY
SYSTEMS, COMPUTERS, MODELS (SIMULATIONS), LANGUAGE,
GAME THEORY, JOB ANALYSIS, AUTOMATION, DESIGN

(U)

IDENTIFIERS: SAGE

(U)

THE REPORT DESCRIBES EXPLORATORY DEVELOPMENTS ON
LABORATORY MODELS OF AUTOMATED TRAINING SUBSYSTEMS
FOR INFORMATION SYSTEMS. SUCH SUBSYSTEMS COULD
PROVIDE FUTURE INFORMATION SYSTEMS WITH THE
CAPABILITY TO TRAIN THEIR USERS ON-THE JOB. THE
REPORT OUTLINES ON-GOING STUDIES CONCERNED WITH
(1) THE UNIQUE TRAINING REQUIREMENTS IN ADVANCED
INFORMATION SYSTEMS; (2) NEW TRAINING CONCEPTS
AND TECHNIQUES TO MEET THESE REQUIREMENTS; AND
(3) AN ANALYTIC TOOL TO DESCRIBE FUNCTIONAL AND
STRUCTURAL OVERLAP OF EQUIPMENT REQUIRED FOR BOTH
OPERATIONS AND TRAINING. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-602 042

BIO-DYNAMICS INC CAMBRIDGE MASS
DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED
ON-THE-JOB TRAINING. II. DESIGN OF SELF-
INSTRUCTIONAL FEATURES (U)

JAN 64 34P SHERIDAN, THOMAS B. I

DUGGAR, BENJAMIN C. ; MAYER, SYLVIA R. I

CONTRACT: AF19 628 455

PROJ: 7682

TASK: 768204

MONITOR: ESD TDR64 234

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•COMMAND AND CONTROL SYSTEMS, TRAINING
DEVICES), (•TRAINING DEVICES, TEACHING MACHINES),
BEHAVIOR, HUMAN ENGINEERING, CODING, PROGRAMMING
(COMPUTERS), DECISION MAKING, TRAINING, LEARNING,
EDUCATION, COMPUTERS, LANGUAGE, AUTOMATION, MODELS
(SIMULATIONS), DESIGN (U)

IDENTIFIERS: SAGE (U)

THE REPORT IS CONCERNED WITH HUMAN ENGINEERING
FACTORS IN THE DESIGN OF INFORMATION SYSTEMS. IN
PARTICULAR IT IS ADDRESSED TO THE DESIGN OF SELF-
INSTRUCTIONAL FEATURES FOR THESE SYSTEMS. IT
DESCRIBES THEORIES, METHODOLOGY, AND DESIGN
PRINCIPLES FOR IMPLEMENTATION OF SELF-INSTRUCTIONAL
FEATURES. THE DESIGN PRINCIPLES WERE INDUCED FROM
THE EXPLORATORY RESEARCH ON LABORATORY MODELS OF
INFORMATION SYSTEMS WHICH IS REPORTED IN VOLUME I
OF THIS SERIES (AD-602 041), FROM STUDIES ON
CURRENT INFORMATION SYSTEMS, AND FROM A LITERATURE
REVIEW. THE OPERATIONAL CONCEPTS UNDERLYING THE
STUDY ARE STATED, AND AN EQUIPMENT DESIGN PHILOSOPHY
IS PROPOSED TO COMPLEMENT THIS OPERATIONAL CONCEPT.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-605 387

INSTITUTE OF ENVIRONMENTAL PSYCHOPHYSIOLOGY UNIV OF
MASSACHUSETTS AMHERST
THE EFFECT OF VARIOUS MODES OF REHEARSAL ON SHORT-
TERM RECALL. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

JUN 64 8P LEWIS, MARY ELEANOR ;

TEICHAER, WARREN H. ;

CONTRACT: N61339 1303

MONITOR: NAVTRADEVEN , 1303 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TWO OTHER STUDIES PERFORMED UNDER THIS
CONTRACT ARE 1303-2 AND 1303-3, DATED 11 JUN 64.

DESCRIPTORS: (*RECALL, PERFORMANCE TESTS), (*DECISION
MAKING, RECALL), PERFORMANCE (HUMAN), STRESS
(*PSYCHOLOGY), VISION, AFTER-IMAGES, MEMORY, CHARACTER
RECOGNITION, RETENTION, LEARNING, AUDITORY SIGNALS,
VISUAL SIGNALS, RADAR OPERATORS, SYSTEMS ENGINEERING,
WEAPON SYSTEMS, PSYCHOPHYSIOLOGY, PSYCHOMETRICS (U)
IDENTIFIERS: REHEARSAL, MAN-MACHINE SYSTEMS (U)

AS PART OF A PROGRAM OF STUDY DIRECTED TO IMPROVING
HUMAN DATA RECEPTION, PROCESSING AND STORAGE, THIS
ACTIVITY SPONSORED EXPERIMENTAL RESEARCH TO
INVESTIGATE THREE VARIABLES: THE STRATEGIES
EMPLOYED BY HUMAN SUBJECTS; THE ORGANIZATION OF THE
INFORMATION BEING COMMUNICATED; AND THE
CHARACTERISTICS OF THE DISPLAY ITSELF. THIS REPORT
DEALS WITH THE HUMAN OPERATION OF REHEARSING BRIEFLY-
PERCEIVED ALPHA-NUMERIC MATERIAL. THE RESULTS
SUPPORT THE CONCLUSION THAT, UNDER CERTAIN CONDITIONS
OF TASK STRESS, APPROPRIATE REHEARSAL CAN IMPROVE
THAT HUMAN PERFORMANCE WHICH IS A FUNCTION OF
SHORT TERM MEMORY AND, THUS, IN A MAN-MACHINE
RELATIONSHIP, IMPROVE SYSTEM PERFORMANCE.
SUGGESTED EXAMPLES ARE GIVEN OF THE APPLICATION OF
THE FINDINGS WITHIN A MILITARY CONTEXT, E.G., RADAR-
SCOPE MONITORING WITHIN A COMBAT INFORMATION
CENTER (CIC). (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z(246)

AD-605 928

PHILCO CORP PALO ALTO CALIF

A HUMAN ENGINEERING EVALUATION OF SOME
SELFILLUMINATED IN-LINE DIGITAL DISPLAYS, (U)

JUL 61 IV SHOENBERGER, L. I

REPT. NO. WDL-TR1587

CONTRACT: AFOM 647 532

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (HUMAN ENGINEERING, DISPLAY SYSTEMS),
(DISPLAY SYSTEMS, HUMAN ENGINEERING), CHARACTER
RECOGNITION, REACTION (PSYCHOLOGY), REFLEXES,
PERFORMANCE TESTS, MONITORS, ANALYSIS OF VARIANCE,
COMMUNICATION SYSTEMS, CONTROL SYSTEMS, DIGITAL
SYSTEMS, VISUAL SIGNALS (U)

THIS REPORT DESCRIBES AN EVALUATION OF SIX IN-LINE
SELFILLUMINATED DIGITAL DISPLAYS. BASED ON
READABILITY, THE EVALUATION COVERS A RANGE OF 117
VIEWING CONDITIONS OF THE DISPLAYS. THE NUMBER OF
CORRECT RESPONSES THAT FOUR OBSERVERS MADE TO EACH
DISPLAY WAS SUBJECTED TO AN ANALYSIS OF VARIANCE AND
TESTS OF SIGNIFICANCE. THE CONCLUSION OF THE
EXPERIMENT WAS THAT A CHARACTER PROJECTION DEVICE WAS
SUPERIOR TO THE OTHER DISPLAYS OVER ALL VIEWING
CONDITIONS, TAKEN AS A WHOLE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 4C0463

AD-608 367

RAND CORP SANTA MONICA CALIF

THE LOGIC OF INTERROGATING A DIGITAL COMPUTER, (U)

NOV 64 24P MARON, M. E. ;

REPT. NO. R-3006

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE 1964 LINGUISTIC
INSTITUTE OF THE LINGUISTIC SOCIETY OF AMERICA,
UNIV. OF INDIANA, BLOOMINGTON.

DESCRIPTORS: (*DIGITAL COMPUTERS, COMPUTER LOGIC),
(*COMPUTER LOGIC, DIGITAL COMPUTERS), LANGUAGE,
ARTIFICIAL INTELLIGENCE, CYBERNETICS, COMMUNICATION
THEORY, INFORMATION RETRIEVAL, PROBABILITY,
MATHEMATICAL LOGIC (U)

THE TOPICS DISCUSSED IN THIS PAPER ARE (1) THE
INFORMATION SCIENCES, (2) INTERROGATING A DIGITAL
COMPUTER, (3) DATA RETRIEVAL SYSTEMS, AND (4)
CYBERNETICS, MEANING, AND COMPREHENSION. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-609 486

UTAH UNIV SALT LAKE CITY

INFORMATION AND SCIENTIFIC CREATIVITY, (U)

JUN 64 20P TAYLOR, CALVIN W. ;

CONTRACT: AF AFOSR144 63

MONITOR: AFOSR , 64 2502

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PAPER PRESENTED AT THE SECOND
SYMPOSIUM OF THE FEDERAL COUNCIL FOR SCIENCE AND
TECHNOLOGY, 13 APR 64, ON THE TOPIC, 'TECHNICAL
INFORMATION AND THE FEDERAL LABORATORY.'

DESCRIPTORS: (*SCIENTIFIC PERSONNEL, PERFORMANCE
(HUMAN)), (*INFORMATION RETRIEVAL, SCIENTIFIC
PERSONNEL), HUMAN ENGINEERING, SUPERVISORY PERSONNEL,
SYMPOSIA, INTELLIGENCE TESTS, LEARNING, MEMORY,
REASONING, INDUSTRIAL PSYCHOLOGY (U)

IDENTIFIERS: CREATIVE THINKING (U)

IN THIS PAPER THE PROBLEM OF STUDYING WHAT
CONSTITUTES EFFECTIVENESS AND CREATIVITY IN A
SCIENTIST IS DISCUSSED. THE WAY THE SCIENTIST
RECEIVES AND HANDLES INFORMATION, THE INTELLECTUAL
CLIMATE IN WHICH HE WORKS, AND THE NATURE OF THE
INFORMATION RECEIVED BY HIM ARE ALL EXAMINED IN THEIR
BEARING ON THE CREATIVE PROCESS. (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZCD463

AD-609 749

MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS
LAB

HUMAN USE OF SHORT TERM MEMORY IN PROCESSING
INFORMATION ON A CONSOLE,

(U)

SEP 64 49P ZEIGLER, BERNARD P. ;

SHERIDAN, THOMAS B. ;

REPT. NO. DSR-9960-1

CONTRACT: AF19 628 3317

PROJ: 7682

TASK: 768204

MONITOR: ESO ,

TDR64 620

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTER PERSONNEL, MEMORY),
(*COMPUTER STORAGE DEVICES, HUMAN ENGINEERING),
DECISION MAKING, COMPUTERS, INFORMATION RETRIEVAL,
DATA PROCESSING SYSTEMS, DATA STORAGE SYSTEMS,
COMMUNICATION THEORY, LEARNING

(U)

IDENTIFIERS: MAN-MACHINE SYSTEMS

(U)

THE REPORT ASSUMES THAT AN OPERATOR'S CONSOLE
CONSTITUTES A THIRD FORM OF MEMORY IN ADDITION TO
THAT INTEGRAL TO THE HUMAN AND THAT INTEGRAL TO THE
MACHINE WHICH IS NOT DIRECTLY ACCESSIBLE TO THE
HUMAN. QUESTIONS ARE RAISED CONCERNING THE
CHARACTERISTIC MODES OF HUMAN STORAGE AND RETRIEVAL
OF INFORMATION FROM INTERNAL MEMORY WHEN SUCH
EXTERNAL MEMORY IS ACCESSIBLE. THE REPORT ALSO
INTRODUCES THE CONCEPT OF ASSOCIATIVE MEMORY NETS
FORMED BY CUEPELATED IMAGES OF EXTERNAL EVENTS. A
LIST PROCESSING EXPERIMENT IS DESCRIBED. STORAGE
STRUCTURES CHARACTERIZING INTERNAL HUMAN MEMORY AND
EXTERNAL CONSOLE MEMORY IN THIS TASK ARE POSTULATED.
A RETRIEVAL MODE IMPLIED BY THESE STRUCTURES IS
CONSTRUCTED TO ACCOUNT FOR THE EFFECTS OF COMPUTATION
AND LEARNING UPON THE FEATURES OF THE EXPERIMENTALLY
OBTAINED CURVES. INSUFFICIENT RETRIEVAL OF
REQUIRED INFORMATION FROM INTERNAL MEMORY IS ASSUMED
TO NECESSITATE EXTERNAL MEMORY SEARCH. THE EFFECT
OF COMPUTATION IS TO INCREASE THE PROBABILITY OF
INSUFFICIENT RETRIEVAL AND HENCE THE FREQUENCY OF
EXTERNAL SEARCH. LEARNING DECREASES THIS
PROBABILITY. THE EFFECTS OF INDUCING ALTERNATE
FORMS OF INTERNAL STORAGE ARE STUDIED AND FOUND
GENERALLY TO RESULT IN INCREASED STORAGE AND
RETRIEVAL TIMES. IMPLICATIONS FOR CONSOLE DESIGN
ARE DISCUSSED. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-614 228

PENNSYLVANIA UNIV PHILADELPHIA MOORE SCHOOL OF
ELECTRICAL ENGINEERING
THE EVALUATION OF TECHNIQUES AND DEVICES AS APPLIED
TO PROBLEM SOLVING. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

FEB 65 113P RUBINOFF, MORRIS (WHITE, J. F.
JR.; ILOEV, DAVID; BLUMBERG, DONALD F. ;

CONTRACT: AF30 602 3065

PROJ: 4594

TASK: 459404

MONITOR: RADC , TOR-64-402

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ARTIFICIAL INTELLIGENCE, DECISION
MAKING), (*DECISION MAKING, HUMANS), COMPUTERS,
PERFORMANCE (HUMAN), GAME THEORY, INFORMATION
RETRIEVAL, MATHEMATICAL MODELS, LEARNING, GROUP
DYNAMICS, PERSONALITY, PROBABILITY (U)

IDENTIFIERS: PROBLEM SOLVING, PREDICTION, CREATIVE
THINKING (U)

THE PROBLEM OF FORECASTING TECHNOLOGICAL CHANGE IS
INVESTIGATED. MACHINES AND COMPUTER PROGRAMS
HAVING 'PROBLEM SOLVING' CAPABILITIES ARE EXAMINED TO
DETERMINE THEIR USEFULNESS IN AIDING OR REPLACING THE
HUMAN FORECASTER. THE LITERATURE ON HUMAN PROBLEM
SOLVING WAS ALSO REVIEWED. THE FOLLOWING
CONCLUSIONS WERE REACHED: (1) THE NATURE OF THE
FORECASTING PROBLEM PRECLUDES THE USE OF COMPUTER-
TYPE PROBLEM SOLVERS DEVELOPED TO DATE, AND (2)
THE APPLICATION OF INFORMATION SCIENCE TECHNIQUES,
NAMELY: DESCRIPTORS REPRESENTING TECHNOLOGICAL
CONCEPTS, THE FORCES ACTING TO CHANGE THE TECHNOLOGY
AND THE LAWS GOVERNING THE CHANGE, APPEAR TO OFFER
THE MOST PROMISE IN ASSISTING THE HUMAN FORECASTER.
ACCORDINGLY, A QUASIMATHEMATICAL MODEL WAS
DEVELOPED USING MATRIX NOTATION TO DESCRIBE A
TECHNOLOGY. AN EXAMPLE OF A FORECAST OF COMPUTER
TECHNOLOGY MADE SEVERAL YEARS AGO IS INCLUDED.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZCQ463

AD-616 544

BIO-DYNAMICS INC CAMBRIDGE MASS

DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED
ON-THE-JOB TRAINING. VOLUME III. EXPERIMENTAL USE OF
THREE INSTRUCTIONAL CONCEPTS, (U)

MAR 65 84P SHERIDAN, THOMAS B. ;

CONTRACT: AF19 628 455

PROJ: 7682

TASK: 768204

MONITOR: ESO ; TDR-64-234 V3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-602 041, AD-602 042.

DESCRIPTORS: (*TRAINING DEVICES, COMMAND +
CONTROL SYSTEMS), (*COMMAND + CONTROL SYSTEMS,
TRAINING DEVICES), DESIGN, AUTOMATION,
TEACHING MACHINES, COMPUTERS, BEHAVIOR, GAME
THEORY, PERFORMANCE (HUMAN), PERFORMANCE TESTS,
DISPLAY SYSTEMS, CONTROL PANELS, ERRORS,
DECISION MAKING, HUMAN ENGINEERING, AIR FORCE
PERSONNEL (U)

IDENTIFIERS: ON-THE-JOB TRAINING, MAN-MACHINE
SYSTEMS (U)

THE REPORT DESCRIBES THREE EXPERIMENTS IN WHICH
NOVEL TEACHING CONCEPTS WERE DEMONSTRATED. THESE
CONCEPTS HAD BEEN PROPOSED IN PREVIOUS REPORTS BUT
THEIR EFFECTIVENESS REMAINED TO BE VERIFIED
EXPERIMENTALLY. THE RESULTS WERE: (1) A
TEACHING PROGRAM ORDERED ACCORDING TO THE DISCOVERY
PRINCIPLE SIGNIFICANTLY REDUCED ERRORS AND
PERFORMANCE TIME OVER THAT OBSERVED AFTER TRAINING
WITH A CONVENTIONAL TRAINING MANUAL. (2) SLIDES
PROJECTED DIRECTLY ONTO A CONTROL CONSOLE, TOGETHER
WITH A TAPED LECTURE, WERE FOUND TO BE AN EFFECTIVE
METHOD OF PRESENTING AN AUTOMATED TRAINING PROGRAM.
(3) GRAPHICAL LOGICAL FLOW DIAGRAMS WERE FOUND TO
BE EFFICIENT INSTRUCTIONS FOR TEACHING PROCEDURES FOR
PERFORMING A QUERYING-REASONING TASK. IT WAS
CONCLUDED THAT THESE CONCEPTS SHOULD BE EXPLOITED IN
TRAINING PROGRAMS FOR OPERATORS OF AIR FORCE
INFORMATION SYSTEMS. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZCD463

AD-616 545

BIO-DYNAMICS INC CAMBRIDGE MASS

DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED
ON-THE-JOB TRAINING, VOLUME V. (U)

DESCRIPTIVE NOTE: FINAL RPT. FOR 1962-1964,

APR 65 22P SHERIDAN, THOMAS B. ;

CONTRACT: AF19 628 455

PROJ: 7682

TASK: 768204

MONITOR: ESD , TDR-64-234 V5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-616 551.

DESCRIPTORS: (*COMMAND + CONTROL SYSTEMS,
TRAINING DEVICES), (*TRAINING DEVICES, COMMAND
+ CONTROL SYSTEMS), DESIGN,
MODELS(SIMULATIONS), COMPUTERS, AUTOMATION,
PROGRAMMING(COMPUTERS), DECISION MAKING,
DISPLAY SYSTEMS, TEACHING MACHINES (U)

IDENTIFIERS: FLOW CHARTS, MAN-MACHINE SYSTEMS,
ON-THE-JOB TRAINING (U)

THE REPORT DESCRIBES THE RESULTS AND CONCLUSIONS OF
A STUDY WHICH WAS DIRECTED AT THE DEVELOPMENT OF
PRINCIPLES FOR THE DESIGN OF AUTOMATED INSTRUCTIONAL
SUBSYSTEMS FOR INFORMATION SYSTEMS. A SERIES
OF FOUR TECHNICAL DOCUMENTARY REPORTS HAVE BEEN
ISSUED WHICH DESCRIBE IN DETAIL THE ACTIVITIES AND
RESULTS OF EACH ASPECT OF THE STUDY. THIS REPORT
BRINGS TOGETHER AND SUMMARIZES THE RESULTS REPORTED
IN THE INDIVIDUAL DOCUMENTS, AND INCLUDES ADDITIONAL
ITEMS WHICH DID NOT WARRANT SEPARATE DOCUMENTATION.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-616 551

BIO-DYNAMICS INC CAMBRIDGE MASS
DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED
ON-THE-JOB TRAINING. VOLUME IV. GRAPHICAL SYMBOLOGY
AND LOGIC DIAGRAMS FOR USE AS TRAINING AIDS, (U)
JAN 65 43P DUGGAR, BENJAMIN C. ;
ROSENBERG, RONALD C. ; SHERIDAN, THOMAS B. ;
MAYER, SYLVIA R. ;

CONTRACT: AF19 628 455

PROJ: 7682

TASK: 768204

MONITOR: ESD , TDR-64-234 V4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-616 544.

DESCRIPTORS: (*COMMAND + CONTROL SYSTEMS,
TRAINING DEVICES), (*TRAINING DEVICES,
GRAPHICS), COMPUTERS, PROGRAMMING (COMPUTERS),
COMPUTER LOGIC, LANGUAGE, BEHAVIOR, DECISION
MAKING, INSTRUCTION MANUALS, CONTROL PANELS,
TEACHING MACHINES (U)
IDENTIFIERS: FLOW CHARTS, MAN-MACHINE SYSTEMS,
ON-THE-JOB TRAINING (U)

THE REPORT DESCRIBES THE RESULTS OF A STUDY TO
DEVELOP A GRAPHICAL SYMBOLOGY AND LOGIC DIAGRAMING
TECHNIQUE FOR USE AS A TRAINING AID. THIS WORK IS
ADDRESSED TO THE NEED FOR A LANGUAGE WHICH DESCRIBES
THE LOGICAL RELATIONSHIPS AMONG TASK COMPONENTS AND
THE INTERACTIONS BETWEEN MAN AND MACHINE IN ADVANCED
COMPUTER-BASED INFORMATION SYSTEMS. SYMBOLS AND A
LOGIC DIAGRAMING TECHNIQUE WERE DEVELOPED AND REFINED
BY UTILIZATION WITH SEVERAL DIFFERENT TYPES OF TASKS.
THIS 'LANGUAGE' HAS BEEN FOUND TO BE USEFUL FOR THE
FOLLOWING PURPOSES: (A) TO SUPPLEMENT WRITTEN
INSTRUCTION MANUALS, (B) AS AN INSTRUCTIONAL TOOL
WITHOUT TEXT, AND (C) AS A PERFORMANCE AID WHEN
DISPLAYED DIRECTLY ON AN OPERATIONAL CONSOLE. A
STEP-BY-STEP METHODOLOGY FOR CONSTRUCTING LOGIC FLOW
DIAGRAMS IS PRESENTED, AND APPLICATIONS ARE
DISCUSSED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-623 619

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

APPLICATION OF BEHAVIORAL SCIENCE TO PERFORMANCE AID
DEVELOPMENT. (U)

DESCRIPTIVE NOTE: STATE-OF-THE-ART REPT.,

AUG 65 20P TOPMILLER, DONALD A. I

REPT. NO. AMRL-TR-65-146

PROJ: 7184

TASK: 718406

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HUMAN ENGINEERING, DISPLAY
SYSTEMS), (*DATA PROCESSING SYSTEMS, HUMAN
ENGINEERING), (*INSTRUCTION MANUALS, HUMAN
ENGINEERING), NUMBERS, MAINTENANCE,
MAINTAINABILITY, MALFUNCTIONS, AIR FORCE
EQUIPMENT, SPECIFICATIONS, SYSTEMS ENGINEERING,
CHECKOUT PROCEDURES, SIMULATION, DESIGN (U)

FOUR CLASSES OF VARIABLES RELEVANT TO BEHAVIORAL
RESEARCH ON THE DEVELOPMENT OF PERFORMANCE AIDS
(TECHNICAL ORDERS, MAINTENANCE MANUALS, ETC.) ARE
OUTLINED: (A) LEGIBILITY AND FORMAT
VARIABLES; (B) VARIABLES ASSOCIATED WITH
PROCESSING PRINTED NUMERIC INFORMATION;
(C) VARIABLES ASSOCIATED WITH THE PHYSICAL
CONFIGURATION OF PERFORMANCE AIDS; AND, (D)
VARIABLES ASSOCIATED WITH TROUBLESHOOTING
INFORMATIONAL PROCESSING AND DISPLAY SYSTEMS.
EACH OF THESE TOPICS IS DISCUSSED WITHIN A
HISTORICAL FRAMEWORK, WITH SUPPORTING EMPIRICAL
RESEARCH. SOME PREDICTIONS ARE MADE FOR FUTURE
TRENDS IN PERFORMANCE-AID BEHAVIORAL STUDIES.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-628 206 5/2 5/5
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
HUMAN ENGINEERING THE GPDS/LUCID SYSTEM:
CONSIDERATIONS AND PLANS. (U)
DESCRIPTIVE NOTE: TECHNICAL MEMO.,
NOV 65 30P SIMON, CHARLES W. ;
REPT. NO. TM-2776,
CONTRACT: AF 19(628)-5166,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INFORMATION RETRIEVAL; DISPLAY
SYSTEMS), (*HUMAN ENGINEERING, INFORMATION
RETRIEVAL), DATA PROCESSING SYSTEMS, DATA STORAGE
SYSTEMS, SYSTEMS ENGINEERING, PROGRAMMING
LANGUAGES (U)
IDENTIFIERS: GPDS PROJECT, LUCID LANGUAGE (U)

HUMAN ENGINEERING CONSIDERATIONS AND PLANS FOR THE
STUDY AND EVALUATION OF THE GPDS/LUCID SYSTEM ARE
DISCUSSED. SPECIFIC PROJECT GOALS ARE: (1) TO
DETERMINE HOW WELL THE CURRENT SYSTEMS MATCH USERS'
NEEDS, AND (2) TO MAKE RECOMMENDATIONS FOR
IMPROVING THE SYSTEM WHERE THESE NEEDS ARE NOT MET.
AN ULTIMATE PROJECT GOAL WILL BE TO DETERMINE HUMAN
ENGINEERING DESIGN PRINCIPLES USEFUL FOR THE
DEVELOPMENT OF USER-ORIENTED, ON-LINE INFORMATION
PROCESSING SYSTEMS IN GENERAL. PROJECT
INVESTIGATION WILL EXAMINE THE GPDS/LUCID SYSTEMS
FROM THE POINT OF VIEW OF A USER WHO IS ESSENTIALLY
UNSOPHISTICATED IN COMPUTER PROGRAMMING. (U)
(AUTHOR)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-631 182 5/8 5/5 22/2 9/2
COMPUTER CONCEPTS INC LOS ANGELES CALIF
THE ROLE OF COMPUTERS IN HANDLING AEROSPACE SYSTEMS
HUMAN FACTORS TASK DATA. (U)
DESCRIPTIVE NOTE: FINAL REPT. 3 JUN 64-3 JUN 65,
DEC 65 183P WHITEMAN, IRVIN R. ;
CONTRACT: AF 33(615)-1557,
PROJ: AF-1710,
TASK: 171006,
MONITOR: AMRL , TR-65-206

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-621 379.

DESCRIPTORS: (*DATA PROCESSING SYSTEMS, HUMAN
ENGINEERING), (*HUMAN ENGINEERING, WEAPON
SYSTEMS), (*SPACE FLIGHT, SYSTEMS ENGINEERING),
(*AIR FORCE, SYSTEMS ENGINEERING), MANAGEMENT
ENGINEERING, PERSONNEL MANAGEMENT, DECISION
MAKING, AUTOMATION, INFORMATION RETRIEVAL,
SUPERVISORY PERSONNEL, COMPUTERS, DATA STORAGE
SYSTEMS, PERFORMANCE(HUMAN), GROUND SUPPORT
EQUIPMENT (U)

THE CHARACTERISTICS OF A COMPUTER BASED DATA SYSTEM
FOR HANDLING HUMAN FACTORS TASK INFORMATION GENERATED
IN SUPPORT OF ADVANCED SYSTEM DEVELOPMENT ARE
DESCRIBED. ON THE BASIS OF INFORMATION GATHERED
FROM USERS AND GENERATORS OF DATA AT REPRESENTATIVE
GOVERNMENT AND CONTRACTOR INSTALLATIONS, THE
CURRENT AND POTENTIAL USES OF COMPUTERS WERE ASSESSED
TO DETERMINE THE DESIRABLE CHARACTERISTICS FOR A
COMPUTERIZED HUMAN FACTORS TASK DATA HANDLING SYSTEM.
THE PROPOSED DATA HANDLING SYSTEM WILL ASSIST THE
HUMAN FACTORS SPECIALIST AND SYSTEM DESIGN ENGINEERS
IN THE DESIGN AND DEVELOPMENT OF SYSTEMS BY PROVIDING
THEM WITH MEANS FOR: (1) DRAWING THEM CLOSER TO
THE DATA THROUGH A USER-ORIENTED SYSTEM, (2)
COMPARING DATA GENERATED THROUGHOUT THE LIFE-CYCLE OF
AN ADVANCED SYSTEM AND ACROSS SYSTEMS, (3)
ANALYZING DATA AND CONDUCTING MAN-MACHINE
SIMULATIONS, AND (4) INSURING THAT DATA ARE MADE
AVAILABLE ON A SELECTIVE QUERY AND A TIMELY BASIS.
THESE OBJECTIVES ARE MET WITHIN THE FRAMEWORK OF A
DATA SYSTEM CONCEPT REFERRED TO AS CENTRAL. THE
FUNCTIONS OF CENTRAL ARE: (1) DATA STORAGE AND
RETRIEVAL, (2) DATA PROCESSING, (3) COMPUTER
PROGRAM MAINTENANCE, AND (4) SYSTEM OPERATIONAL
MANUAL MAINTENANCE. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-634 313 15/3 17/2 5/5
ARMY PERSONNEL RESEARCH OFFICE WASHINGTON D C
HUMAN FACTORS RESEARCH IN COMMAND INFORMATION
PROCESSING SYSTEMS, (U)
MAR 66 27P RINGEL, S. ;VICINO, F. L. ;
ANDREWS, R. S. ;
REPT. NO. APRO-TRR-1145
PROJ: DA-2J024701A723,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMMAND + CONTROL SYSTEMS,
DECISION MAKING), (*COMBAT INFORMATION CENTERS,
*HUMAN ENGINEERING), DATA PROCESSING SYSTEMS,
DISPLAY SYSTEMS, MILITARY REQUIREMENTS, MILITARY
TACTICS, COMPUTERS, INFORMATION RETRIEVAL (U)

THE REPORT DESCRIBES THE SCOPE, RATIONALE,
ORGANIZATION, AND PROGRESS OF A COMMAND SYSTEMS
RESEARCH PROGRAM TO PROVIDE HUMAN FACTORS INFORMATION
NEEDED FOR PERFORMANCE WITHIN COMPLEX AUTOMATED
INFORMATION PROCESSING SYSTEMS. FOLLOWING A SURVEY
OF MILITARY INFORMATION PROCESSING EQUIPMENT AND
OPERATIONS AND FUTURE PLANS FOR COMMAND INFORMATION
PROCESSING SYSTEMS, BASIC HUMAN FACTORS PROBLEMS WERE
IDENTIFIED AND ORGANIZED AROUND FIVE CRITICAL
OPERATIONS--SCREENING INCOMING DATA, TRANSFORMING RAW
DATA FOR INPUT INTO STORAGE DEVICES, INPUT,
ASSIMILATION OF DISPLAYED INFORMATION, AND DECISION
MAKING. A RESEARCH PROGRAM WAS FORMULATED AND
STUDIES UNDERTAKEN TO YIELD EMPIRICAL INFORMATION
ABOUT THE EFFECTS ON HUMAN PERFORMANCE OF (1)
CHARACTERISTICS OF THE INFORMATION PRESENTED
(DENSITY, AMOUNT, ETC.); (2) DYNAMIC ASPECTS OF
INFORMATION (TYPE, EXTENT, CODING OF UPDATES);
(3) DISPLAY MODES AND SENSORY MODALITIES (GROUP
VS INDIVIDUAL DISPLAYS, MULTISENSORY DISPLAYS); AND
(4) COMPUTER AIDS TO THE DECISION PROCESS. A
COMMAND SYSTEMS LABORATORY WAS DEVELOPED TO
PERMIT SIMULATION OF VARIOUS TOS FUNCTIONS.
FINDINGS HAVE SUGGESTED THE POSSIBILITY OF
REDUCTION IN STORAGE CAPACITY REQUIREMENTS, NUMBER OF
DISPLAYS CALLED FROM STORAGE DURING A GIVEN
OPERATIONAL TIME PERIOD, AND TIME REQUIRED FOR THE
TOTAL INFORMATION ASSIMILATION-DECISION PROCESS AND
SUPPORTED THE INCORPORATION AND USE OF INFORMATION
CONSPICUITY CODING CAPABILITIES IN COMMAND SYSTEMS.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-636 170 5/5 5/8 9/2
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA RESEARCH AND
ENGINEERING SUPPORT DIV
HUMAN FACTORS PROBLEMS IN COMPUTER-GENERATED GRAPHIC
DISPLAYS. (U)

APR 66 118P BARMACK, JOSEPH E. ;
SINAIKO, H. WALLACE ;
REPT. NO. IDA/MG-66-4820, STUDY S-234
CONTRACT: SD-50,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HUMAN ENGINEERING, DISPLAY
SYSTEMS), (*DISPLAY SYSTEMS, GRAPHICS),
COMPUTERS, MAN-MACHINE SYSTEMS, INPUT-OUTPUT
DEVICES, THEORY, LIGHT, COLORS (U)

THE STUDY IS A REVIEW OF CURRENT PRACTICES IN
COMPUTER-GENERATED GRAPHIC DISPLAYS FROM THE POINT OF
VIEW OF ENGINEERING PSYCHOLOGY, INPUT DEVICES,
WHICH ARE INTEGRAL TO MAN-COMPUTER SYSTEMS, ARE ALSO
CONSIDERED. THEORIES OF COGNITION ARE EXAMINED
WITH RESPECT TO THEIR APPLICABILITY TO COMPUTER-
GRAPHICS. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-636 313 6/4 9/2
SYSTEM RESEARCH LTD RICHMOND (ENGLAND)
A CYBERNETIC MODEL OF HUMAN DATA PROCESSING. (U)
64 16P PASK, GORDON ;
CONTRACT: AF 61(052)-640, AF 61(052)-402

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED FOR PRESENTATION AT THE
PROCEEDINGS OF THE INTERNATIONAL UNION OF
PHYSIOLOGICAL SCIENCES, INTERNATIONAL CONGRESS
(22ND) IN LEIDEN, 1962 P218-33.

DESCRIPTORS: (*CYBERNETICS, BEHAVIOR),
(*BIONICS, BEHAVIOR), HUMANS, DATA PROCESSING
SYSTEMS, LEARNING MAN-MACHINE SYSTEMS, GREAT
BRITAIN (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-637 814 5/2 5/5 15/7
ARMY PERSONNEL RESEARCH OFFICE WASHINGTON D C
COMMAND INFORMATION PROCESSING SYSTEMS: A HUMAN
FACTORS RESEARCH PROGRAM.

(U)

DESCRIPTIVE NOTE: TECHNICAL RESEARCH REPT.

JUN 66 38P RINGEL, SEYMOUR ;

REPT. NO. APRO-TRR-1148

PROJ: DA-200247C1A723,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (1) INFORMATION RETRIEVAL, ARMY
OPERATIONS, (2) HUMAN ENGINEERING, INFORMATION
RETRIEVAL, TACTICAL DATA PROCESSING
SYSTEMS, COMMAND & CONTROL SYSTEMS, MAN-MACHINE
SYSTEMS, COMPUTERS, MILITARY STRATEGY, DECISION
MAKING, SYSTEMS ENGINEERING

(U)

THE COMMAND SYSTEMS TASK SEEKS TO DEVELOP
RESEARCH INFORMATION BY WHICH THE EFFECTIVENESS OF
CURRENT AND FUTURE COMMAND INFORMATION PROCESSING
SYSTEMS MAY BE MAXIMIZED. PURSUING ITS OBJECTIVE
THROUGH INTENSIVE EXPERIMENTATION IN SPECIFIC ARMY
MAN-MACHINE COMPLEXES, THE PRESENT PUBLICATION
DESCRIBES THE SCOPE, RATIONALE, AND ORGANIZATION OF A
RESEARCH PROGRAM TO PROVIDE THAT INFORMATION TO
DESIGNERS, DEVELOPERS, AND USERS. THE PROGRAM
REPRESENTS A COMPREHENSIVE APPROACH TO RESEARCH
CONCERNED WITH AUTOMATED COMMAND INFORMATION
PROCESSING SYSTEMS, RANGING FROM DETAILED STUDIES OF
DISCRETE HUMAN FUNCTIONS TO INTEGRATION OF SIZABLE
HIGHLY AUTOMATED COMPUTERIZED SYSTEMS. TASK EFFORT
FOR THE PRESENT AND IN THE IMMEDIATE FUTURE WILL BE
CONCENTRATED ON STUDIES DEALING WITH INFORMATION
ASSIMILATION AND DECISION MAKING. THE REPORT
DELINEATES A SERIES OF STUDIES IN PROGRESS OR
PROJECTED ON NINE MAJOR ASPECTS OF THESE FUNCTIONS;
(1) AMOUNT AND DENSITY OF INFORMATION; (2)
SPECIFICITY OF INFORMATION; (3) ALPHA-NUMERIC
AND SYMBOLIC PRESENTATION; (4) TYPE, EXTENT, AND
RATE OF INFORMATION UPDATING; (5) CODING OF
UPDATED INFORMATION AND HARD COPY; (6) SEQUENCE
OF INFORMATION PRESENTATION; (7) INDIVIDUAL AND
GROUP WORK METHODS AND DISPLAYS; (8) VISUAL AND
AUDITORY DISPLAYS; (9) COMPUTER-AIDED
PERFORMANCE. RESEARCH TO BE ACCOMPLISHED IN
REMAINING SUBTASKS CONCERNED WITH PROBLEMS IN THE
INFORMATION PREPARATION AND SYSTEM INTEGRATION AREAS
IS MORE GENERALLY DISCUSSED. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-639 563 5/10 5/5 9/2
RAND CORP SANTA MONIC CALIF
MOTIVATIONAL PROBLEMS IN HUMAN-COMPUTER
OPERATIONS.
JUN 61 13P JORDAN, NEHEMIAH I
REPT. NO. P-2332,

(U)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE ANNUAL HUMAN
ENGINEERING CONFERENCE (9TH), ST. LOUIS, MO., 1-
2 JUN 61.

DESCRIPTORS: (*MOTIVATION, *COMPUTER OPERATORS),
HUMAN ENGINEERING, MAN-MACHINE SYSTEMS,
COMPUTERS

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-640 283 5/2 5/8 9/2
INTERNATIONAL BUSINESS MACHINES CORP POUGHKEEPSIE N Y DATA
SYSTEMS DIV
PSYCHOLOGY FOR A MAN-MACHINE PROBLEM-SOLVING
SYSTEM. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 65 22P MILLER, ROBERT B. I
REPT. NO. TR-00.1246,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PROBLEM SOLVING, MAN-MACHINE
SYSTEMS), (•INFORMATION RETRIEVAL, MAN-MACHINE
SYSTEMS), COMPUTERS, HUMAN ENGINEERING, SUBJECT
INDEXING, PSYCHOLOGY (U)

THE PAPER DEALS WITH THE USE OF COMPUTER
CAPABILITIES TO EXTEND HUMAN CAPABILITIES FOR
INVENTION AND DISCOVERY. A PROGRAMMATIC ROUTE IS
PROPOSED FOR DEVELOPMENT. THE FIRST STAGE IN THIS
ROUTE IS AN ANALYTIC ENUMERATION OF HUMAN ABILITIES
AND LIABILITIES AS A PROBLEM-SOLVING MECHANISM.
THE SECOND STAGE WILL DEAL WITH AN ANALYSIS OF
HUMAN INFORMATION-HANDLING TASKS. THESE TWO STAGES
SHOULD ILLUMINATE SYSTEM OBJECTIVES, WHILE AT THE
SAME TIME OPTIONS FOR DESIGNING THE MAN-MACHINE
PROBLEM-SOLVING ENTITY BECOME CLARIFIED. THE
RESULT WILL BE AN INTELLIGENCE-RETRIEVAL SYSTEM
COMBINED WITH LOGICAL AND EXTRAORDINARY DISPLAY
CAPABILITIES. THE PRINCIPAL DESIGN ISSUES WILL BE
REVEALED AS INDEXING CONTENT AND STRUCTURE AND
DISPLAY SYMBOLOGIES. AN IMPORTANT (AND
NEGLECTED) DIMENSION IN SYSTEM DESIGN IS THE
HUMAN'S ABILITY TO LEARN AND THINK IN NEW LANGUAGE
AND SYMBOLOGIES. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-647 092 5/10 12/1 9/2
MICHIGAN UNIV ANN ARBOR INST OF SCIENCE AND
TECHNOLOGY
NONCONSERVATIVE PROBABILISTIC INFORMATION PROCESSING
SYSTEMS: (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL DOCUMENTARY REPT., SEP
63-APR 66:
DEC 66 95P EDWARDS, WARD I
REPT. NO. 5893-22-F
CONTRACT: AF 19(628)-2823
PROJ: AF-2806
MONITOR: ESD TR-66-404

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-646 101.

DESCRIPTORS: (*DATA PROCESSING SYSTEMS,
PROBABILITY), (*DECISION MAKING, DATA
PROCESSING SYSTEMS), HUMAN ENGINEERING, DECISION
THEORY, EXPERIMENTAL DATA, GAME THEORY,
PSYCHOMETRICS, DESIGN (U)
IDENTIFIERS: BAYES' THEOREM (U)

THE REPORT IS CONCERNED WITH TWO LARGE-SCALE
SIMULATION EXPERIMENTS ON PROBABILISTIC INFORMATION
PROCESSING (PIP) SYSTEMS. ONE, A VERY LARGE AND
PROLONGED STUDY OF FOUR SYSTEMS, YIELDED THE
CONCLUSION THAT PIP IS INDEED AN EFFICIENT
PHILOSOPHY FOR INFORMATION-PROCESSING SYSTEMS--AT
LEAST TWICE AS EFFICIENT AS ITS NEXT-BEST COMPETITOR,
AND FOUR TIMES AS EFFICIENT AS A REPRESENTATIVE OF
CURRENT PROCESSING TECHNIQUES. THE SECOND PIP
EXPERIMENT WAS CONCERNED WITH WHETHER LIKELIHOOD
ESTIMATORS IN PIPS SHOULD BE ALLOWED TO KNOW THE
STATE OF SYSTEM OPINION. THE DATA CONFIRM THE
SUGGESTION THAT IT MIGHT BE UNDESIRABLE. THESE
EXPERIMENTS REQUIRED THE USE OF AN ON-LINE COMPUTER
SYSTEM. THIS COMPARISON OF PIP AND ITS
COMPETITORS CLEARLY INDICATES THAT PIP IS SUPERIOR,
BUT DOES NOT INDICATE HOW PIP COMPARES WITH
THEORETICALLY OPTIMAL PERFORMANCE SINCE NO OBJECTIVE
MODEL OF THE DATA-GENERATING PROCESS WAS AVAILABLE.
A SMALLER-SCALE LABORATORY EXPERIMENT IS REPORTED
THAT COMPARES PIP WITH A POSTERIOR-ODDS ESTIMATION
SYSTEM (POP) IN A TASK SUFFICIENTLY COMPLEX TO BE
DIFFICULT FOR SUBJECTS AND YET ALLOWING AN OBJECTIVE
STANDARD OF CORRECT PERFORMANCE. PIP WAS FAR
SUPERIOR TO POP. PIP AND CALCULATIONS OF OPTIMAL
PERFORMANCE WERE ROUGHLY COMPARABLE, WITH PIP
SOMETIMES MORE EXTREME THAN OPTIMAL PERFORMANCE AND
SOMETIMES LESS EXTREME. ANOTHER SMALL LABORATORY (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-647 993 5/2 5/5
SYSTEM DEVELOPMENT CORP DAYTON OHIO
DEVELOPMENT AND APPLICATION OF COMPUTER SOFTWARE
TECHNIQUES TO HUMAN FACTORS TASK DATA HANDLING
PROBLEMS.

DESCRIPTIVE NOTE: FINAL REPT. 21 JUN 65-21 JUN 66.
DEC 66 175P POTTER, K. W. ITULLEY, A.

T. FREED, LAWRENCE E. ;

CONTRACT: AF 19(628)-3416

PROJ: AF-1710

TASK: 171006

MONITOR: AMRL TR-66-200

(U)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: JOINT NASA/USAF STUDY.

DESCRIPTORS: (DATA PROCESSING SYSTEMS, HUMAN
ENGINEERING), INFORMATION RETRIEVAL, COMPUTERS,
CLASSIFICATION, VOCABULARY, DATA STORAGE
SYSTEMS

(U)

RESEARCH LEADING TO THE APPLICATION OF COMPUTER
SOFTWARE TECHNIQUES FOR HANDLING HUMAN FACTORS TASK
DATA GENERATED IN SUPPORT OF AEROSPACE SYSTEM
DEVELOPMENT PROGRAMS IS DISCUSSED. IT IS
RECOGNIZED THAT DATA HANDLING TECHNIQUES MUST BE
DEVELOPED IN CONTEXT WITH THEIR TOTAL OPERATIVE
ENVIRONMENT. A CONCEPT OF AN OPERATIONAL DATA
MANAGEMENT SYSTEM FOR STORING, PROCESSING, AND
RETRIEVING HUMAN FACTORS TASK DATA IN A GOVERNMENT/
CONTRACTOR ENVIRONMENT IS DISCUSSED AND ILLUSTRATED.
THIS CONCEPT IS PREDICATED ON THE ASSUMPTION THAT A
USER-ORIENTED COMPUTERIZED DATA SYSTEM WILL HELP DRAW
HUMAN FACTORS SPECIALISTS CLOSER TO THEIR DATA.
FIVE PROBLEM AREAS, CONSIDERED TO BE FUNDAMENTAL TO
THE DEVELOPMENT OF DATA HANDLING TECHNIQUES, WERE
RESEARCHED. THESE AREAS ARE: (1) ANALYSIS
OF HUMAN FACTORS TASK DATA, DATA RELATIONSHIPS, AND
CLASSIFICATION SCHEMES, (2) APPLICATION OF
VOCABULARY AND THESAURUS TECHNIQUES TO INCREASE THE
EFFECTIVENESS OF COMMUNICATION AMONG MAN/MACHINE/
SOFTWARE FUNCTIONS, (3) APPLICATION OF COMPUTER
STORAGE AND RETRIEVAL TECHNIQUES TO HUMAN FACTORS
TASK DATA, (4) APPLICATION OF ANALYTICAL AND
SIMULATION TECHNIQUES TO HUMAN FACTORS TASK DATA, AND
(5) APPLICATION OF CURRENT AWARENESS TECHNIQUES
TO PROVIDE NOTIFICATIONS OF DATA AVAILABILITY.
(AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-653 258 9/2 5/10
BATTELLE MEMORIAL INST COLUMBUS OHIO
DESIGN PRINCIPLES FOR LEARNING SYSTEMS, (U)
65 16P TOU, J. T. ;

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN PROCEEDINGS OF IFAC
TOKYO SYMPOSIUM ON SYSTEMS ENGINEERING FOR CONTROL
SYSTEM DESIGN P171-85 1965.
SUPPLEMENTARY NOTE: RESEARCH SUPPORTED IN PART BY
ONR.

DESCRIPTORS: (*LEARNING, HUMANS), (*LEARNING
MACHINES, SYSTEMS ENGINEERING), DESIGN,
CONTROL SYSTEMS, INFORMATION RETRIEVAL, DATA
STORAGE SYSTEMS, DIGITAL COMPUTERS, DECISION
MAKING, COMPUTER LOGIC, DECISION THEORY,
PROGRAMMING(COMPUTERS), SWITCHING CIRCUITS,
AUTOMATION, ARTIFICIAL INTELLIGENCE (U)

THE PAPER REVIEWS THE MAJOR ASPECTS OF HUMAN
LEARNING, AND DISCUSSES SEVERAL LEARNING MECHANISMS
AND SOME OF THE DESIGN PRINCIPLES FOR LEARNING
SYSTEMS. A COMPARISON IS MADE BETWEEN HUMAN
LEARNING AND MACHINE LEARNING. SOME ASPECTS OF
HUMAN LEARNING ARE CONSIDERED IN THE DESIGN OF
LEARNING SYSTEM. FOR THE PURPOSE OF ENGINEERING
DESIGN, LEARNING IS REFERRED TO AS THE ACQUISITION OF
SKILL TO PERFORM MEANINGFUL SELF-MODIFICATION AND TO
IMPROVE PERFORMANCE ON THE BASIS OF PAST EXPERIENCE.
THE THREE BASIC LEARNING MECHANISMS ARE LEARNING BY
ROTE (ZEROth-ORDER LEARNING), LEARNING BY
SELECTIVE REINFORCEMENT (FIRST-ORDER LEARNING),
AND LEARNING BY GENERALIZATION (SECOND-ORDER
LEARNING). THE STORAGE AND RETRIEVAL OF PAST
DATA AND INFORMATION PATTERN IN A DIGITAL COMPUTER,
THE REWARD AND PUNISHMENT SCHEME, AND THE STATISTICAL
INFERENCE AND BAYESIAN DECISION PROCESS ARE
CONSIDERED AS THE ENGINEERING COUNTERPARTS OF THESE
LEARNING MECHANISMS. THE FOUNDATIONS FOR THE
DESIGN OF LEARNING SYSTEMS ARE THRESHOLD LOGIC,
SWITCHING THEORY, DECISION THEORY, BAYESIAN
STATISTICS, STOCHASTIC AUTOMATA, AND HEURISTIC
PROGRAMMING. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-654 818 5/9 5/8
GEORGE WASHINGTON UNIV ALEXANDRIA VA HUMAN RESOURCES
RESEARCH OFFICE
TRAINING RESEARCH UTILIZING MAN-COMPUTER
INTERACTIONS: PROMISE AND REALITY, (U)
JUN 67 19P MCCLELLAND, WILLIAM A. 1
REPT. NO. PROFESSIONAL PAPER 23-67
CONTRACT: DA-44-188-ARO-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AS PART OF THE AVIONICS
PANEL PROGRAM ON NATURAL AND ARTIFICIAL LOGIC
PROCESSORS, ADVISORY GROUP FOR AERONAUTICAL
RESEARCH AND DEVELOPMENT, ATHENS, GREECE, JULY,
1963.

DESCRIPTORS: (•TEACHING METHODS, •MAN-MACHINE
SYSTEMS), LEARNING, COMPUTERS, TRAINING,
MILITARY TRAINING, BEHAVIOR, GROUP DYNAMICS,
DATA PROCESSING SYSTEMS, EFFECTIVENESS (U)

THE PAPER WAS PRESENTED AS PART OF THE AVIONICS
PANEL PROGRAM ON NATURAL AND ARTIFICIAL
LOGIC PROCESSORS, SPONSORED BY THE ADVISORY
GROUP FOR AERONAUTICAL RESEARCH AND
DEVELOPMENT, NATO. SEVERAL CONCEPTUAL
PROPOSITIONS IN REGARD TO MAN AND THE COMPUTER ARE
OFFERED. THE NATURE OF TRAINING RESEARCH IS
EXAMINED. THERE IS ALSO A BRIEF CATEGORIZATION OF
HUMAN BEHAVIOR TO SUGGEST SOME OF THE USES AND SOME
OF THE DIFFICULTIES IN THE UTILIZATION OF COMPUTERS
IN TRAINING RESEARCH. THE ROLE OF THE TRAINING
RESEARCH PSYCHOLOGIST DEALING WITH LARGE GROUPS OF
PEOPLE IN MASS INSTRUCTION IN A MILITARY SETTING IS
DISCUSSED, AS IS THE IMPORTANCE OF THE COMPUTER FOR
DATA PROCESSING AND AS A TOOL FOR SIMULATING COMPLEX
BEHAVIOR. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-656 533 5/8 5/5 5/10
MICHIGAN UNIV ANN ARBOR DEPT OF PSYCHOLOGY
HUMAN INFORMATION-PROCESSING CONCEPTS FOR SYSTEM
ENGINEERS, (U)
65 19P PEW, RICHARD W. ;
CONTRACT: AF 49(638)-1235
PROJ: AF-920F-5002
MONITOR: AFOSR 67-1799

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN SYSTEM ENGINEERING
HANDBOOK P31-3-31-17 1965.

DESCRIPTORS: (•MAN-MACHINE SYSTEMS, SYSTEMS
ENGINEERING), (•HUMAN ENGINEERING, MAN-MACHINE
SYSTEMS), MEMORY, DECISION MAKING, DATA
PROCESSING SYSTEMS, PSYCHOPHYSICS,
PERCEPTION(PSYCHOLOGY) (U)

A DESIGN PHILOSOPHY IS PRESENTED FOR UTILIZING
INFORMATION ABOUT HUMAN PERFORMANCE CAPACITIES AND
LIMITATIONS IN THE DESIGN OF MAN-MACHINE SYSTEMS.
SPECIFIC DATA CONCERNING MAN'S CAPABILITIES FOR
PSYCHOPHYSICAL JUDGMENT, SPEEDED INFORMATION
PROCESSING, MEMORY STORAGE AND PERCEPTUAL MOTOR SKILLS
ARE SURVEYED AND DESCRIBED IN ENGINEERING TERMS WHERE
APPLICABLE. THE VIEW OF MAN AS A SINGLE CHANNEL
LIMITED CAPACITY INFORMATION PROCESSING SYSTEM IS
ADVOCATED. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0443

AD-656 653 5/8 5/5 5/10
MICHIGAN UNIV ANN ARBOR DEPT OF PSYCHOLOGY
RECENT PSYCHOLOGICAL RESEARCH RELEVANT TO THE HUMAN
FACTORS ENGINEERING OF MAN-MACHINE SYSTEMS, (U)
65 7P PEW, RICHARD W. ;
CONTRACT: AF 49(638)-1235
PROJ: AF-929F-5002
MONITOR: AFOSR 67-1824

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN PROCEEDINGS OF THE
NATIONAL ELECTRONICS CONFERENCE 5P OCT 1965.

DESCRIPTORS: (*MAN-MACHINE SYSTEMS, *HUMAN
ENGINEERING), DESIGN, SYSTEMS ENGINEERING,
MEMORY, PSYCHOLOGY, BIONICS, DATA PROCESSING
SYSTEMS, DECISION MAKING (U)

THE EMPHASIS OF THE REPORT WAS TO SURVEY A BODY OF
PSYCHOLOGICAL THEORY AND TO ILLUSTRATE A SPECIFIC
AREA IN WHICH THE THEORY AND ASSOCIATED EMPIRICAL
DATA ARE RELEVANT TO SYSTEM DESIGN PROBLEMS.
WITHIN THE FRAMEWORK DESCRIBING MAN AS A SINGLE-
CHANNEL INFORMATION PROCESSOR AT LEAST, THERE ARE
OTHER EQUALLY RELEVANT BODIES OF DATA. FOR
EXAMPLE, RESEARCH ON THE FUNCTIONAL CHARACTERISTICS
OF THE MEMORY SUBSYSTEM, ESPECIALLY SHORT-TERM MEMORY
ARE AVAILABLE TO ALLOW RELATIVELY PRECISE
SPECIFICATIONS OF TOLERABLE MEMORY LOAD, GIVEN THE
NATURE OF THE MATERIAL TO BE REMEMBERED. THIS
LITERATURE WOULD ALSO SUGGEST INFORMATION FORMAT AND
CODING FOR OPTIMUM RECALL OR RETREVAL. SIMILARLY,
THE ACCUMULATING BODY OF DATA FOCUSED ON ENGINEERING
DESCRIPTIONS OF MAN AS A CONTROLLER IN FEEDBACK
SYSTEMS ARE AVAILABLE FOR THOSE WITH PROBLEMS IN THIS
AREA. IN SHORT IT IS THE CONTENTION OF THE PAPER
THAT ONE SHOULD NOT RETREAT TO THE COMFORT OF HIS
ARMCHAIR AND ITS ASSOCIATED INTUITIVE DESIGN
TECHNIQUES WITHOUT FIRST MAKING A CONSCIENTIOUS
EFFORT TO TALK TO PSYCHOLOGISTS ABOUT HIS PARTICULAR
DESIGN PROBLEM AND TO SEEK OUT THE APPLICABLE
LITERATURE. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-656 701 5/5 5/10 5/9 9/2
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO
ADVANCES IN THE USE OF COMPUTERS FOR HANDLING HUMAN
FACTORS TASK DATA, (U)
APR 67 16P REED, LAWRENCE E. I
REPT. NO. AMRL-TR-67-16
PROJ: AF-1710
TASK: 171006

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN INTERNATIONAL SIMULATION
AND TRAINING CONFERENCE (3RD), NEW YORK, 24-27
APRIL 1967. SUPPORTED BY NASA AND CONTRACT
F33615-67-C-1036 WITH THE SYSTEM DEVELOPMENT CORP.

DESCRIPTORS: (*HUMAN ENGINEERING, *DATA
PROCESSING SYSTEMS), (*JOB ANALYSIS, HUMAN
ENGINEERING), SYSTEMS ENGINEERING, TRAINING,
COMPUTERS, ANALYSIS, DATA, PERSONNEL
MANAGEMENT (U)

THE PURPOSE OF THE PAPER IS TO REVIEW SOME OF THE
DATA PROBLEMS THE ANALYST MUST DEAL WITH IN HIS WORK
AND TO SUGGEST SOME POSSIBLE REMEDIES. A REVIEW OF
THE TASK ANALYSIS PROCEDURES IS FOLLOWED BY A
DISCUSSION OF THE USES OF TASK ANALYSIS IN SYSTEM
DEVELOPMENT PROGRAMS. PROBLEMS CONNECTED WITH EACH
WERE USED TO GENERATE THE GOALS OF A RESEARCH
PROGRAM, WHICH IS DIRECTED TOWARD THE DEVELOPMENT OF
COMPUTERIZED TECHNIQUES TO ASSIST THE ANALYST MAKE
BETTER USE OF AVAILABLE DATA. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-656 709 5/10 5/8 5/5
MICHIGAN UNIV ANN ARBOR DEPT OF PSYCHOLOGY
HUMAN PERFORMANCE IN INFORMATION PROCESSING AND
STORAGE. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUL 67 72P MELTON, ARTHUR W. I
REPT. NO. 05823-41-F
CONTRACT: AF 49(638)-1235, ARPA ORDER-461
PROJ: AF-5002, ORA-05823
MONITOR: AFOSR 67-1874

UNCLASSIFIED REPORT

DESCRIPTORS: (HUMAN ENGINEERING, *MAN-MACHINE
SYSTEMS), INFORMATION THEORY, STIMULATION,
PERFORMANCE(HUMAN), REACTION(PSYCHOLOGY),
REFLEXES, ATTENTION, SENSORY PERCEPTION,
MEMORY, CENTRAL NERVOUS SYSTEM, RESPONSES,
INFORMATION RETRIEVAL, RECALL, RESEARCH PROGRAM
ADMINISTRATION (U)

IDENTIFIERS: INFORMATION
PROCESSING(PSYCHOLOGY) (U)

RESEARCH WAS CONDUCTED IN THE GENERAL FIELD OF
ENGINEERING PSYCHOLOGY, AND SPECIFICALLY ON HUMAN
PERFORMANCE. THIS RESEARCH IS DESIGNED TO PRODUCE
A TAXONOMY OF HUMAN INFORMATION-PROCESSING FUNCTIONS,
TO DETERMINE HUMAN CAPABILITIES AND LIMITATIONS IN
FULFILLING BASIC INFORMATION-PROCESSING FUNCTIONS, TO
DEVELOP A MODEL OF HUMAN SHORT-TERM MEMORY IN THE
INTEREST OF ADVANCING BASIC KNOWLEDGE OF HUMAN
INFORMATION PROCESSES. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZCG463

AD-663 209 5/5 2
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
IMPLEMENTATION OF COMPUTER SOFTWARE TECHNIQUES TO
HUMAN FACTORS TASK DATA HANDLING PROBLEMS. (U)
DESCRIPTIVE NOTE: FINAL REPT. 21 JUN 66-30 JUN 67,
SEP 67 102P TULLEY, A. T. MEYER, G.
R. 1
CONTRACT: F33615-67-C-1036
PROJ: AF-1710
TASK: 171006
MONITOR: AMRL TR-67-127

UNCLASSIFIED REPORT

DESCRIPTORS: (HUMAN ENGINEERING, DATA
PROCESSING SYSTEMS), COMPUTERS, INFORMATION
RETRIEVAL, DATA STORAGE SYSTEMS, SYSTEMS
ENGINEERING (U)

RESEARCH LEADING TO THE IMPLEMENTATION OF COMPUTER
SOFTWARE TECHNIQUES FOR HANDLING HUMAN FACTORS TASK
DATA GENERATED IN SUPPORT OF AEROSPACE SYSTEM
DEVELOPMENT PROGRAMS IS DISCUSSED. TECHNIQUES
BEING EXPLORED IN THIS RESEARCH PROGRAM ARE BASED ON
THE ASSUMPTION THAT A USER-ORIENTED COMPUTERIZED DATA
SYSTEM WILL HELP DRAW HUMAN FACTORS SPECIALISTS
CLOSER TO NEEDED DATA. THE APPLICATION OF SUCH A
SYSTEM WILL REDUCE THE PROBLEM OF DATA ACCESSIBILITY
AND ALLOW MORE EFFECTIVE USE OF DATA IN THE SYSTEM
ENGINEERING PROCESS. PRELIMINARY RESEARCH LEADING
TO PROPOSED DATA HANDLING TECHNIQUES IS DISCUSSED.
A COMPUTERIZED DATA HANDLING SYSTEM TO STORE,
RETRIEVE, AND PROCESS HUMAN FACTORS TASK DATA IS
INITIALLY IMPLEMENTED THROUGH A PILOT STUDY. A
DISCUSSION OF THE PILOT STUDY SPECIFICATION IS
FOLLOWED BY A PRESENTATION OF THE DESIGN
SPECIFICATION FOR A COMPUTERIZED EXPERIMENTAL SYSTEM.
THE EXPERIMENTAL SYSTEM, REFERRED TO AS THE PILOT
STUDY EXPERIMENTAL SYSTEM, PROVIDES THE PRIMARY MEANS
FOR DEMONSTRATING AND EVALUATING THE RESEARCH RESULTS
AGAINST THE ORIGINAL RESEARCH GOALS. COMPUTER
SOFTWARE DESCRIPTIONS ARE PRESENTED FOR IMPLEMENTING
THE PILOT STUDY EXPERIMENTAL SYSTEM IN A USER-
ORIENTED ENVIRONMENT IN TERMS OF INFORMATION NEEDS OF
HUMAN FACTORS SPECIALISTS. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0483

AD-671 128 5/8 5/5
GEORGE WASHINGTON UNIV ALEXANDRIA VA HUMAN RESOURCES
RESEARCH OFFICE
A CONCEPT OF THE ROLE OF MAN IN AUTOMATED
SYSTEMS, (U)
MAY 68 11P MELCHING, WILLIAM H. ;
REPT. NO. PROFESSIONAL PAPER-14-68
CONTRACT: DA-44-188-ARO-2
PROJ: DA-2J024701A712
TASK: 2J024701A712-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE SOUTHWESTERN
PSYCHOLOGICAL ASSOCIATION ANNUAL MEETING, NEW
ORLEANS, LA., APR 1968.

DESCRIPTORS: (*MAN-MACHINE SYSTEMS, HUMAN
ENGINEERING), (*HUMAN ENGINEERING, *DECISION
MAKING), SYMPOSIA, NATIONAL DEFENSE,
ANTIMISSILE DEFENSE SYSTEMS, AUTOMATIC,
COMPUTERS, SYSTEMS ENGINEERING, MALFUNCTIONS,
SELECTION (U)
IDENTIFIERS: SYSTEM OVERRIDE, MANUAL FUNCTIONS,
SYSTEM OVERLOAD (U)

A PROBLEM THAT HAS LONG PLAGUED SYSTEM DESIGNERS
AND HUMAN FACTORS ENGINEERS IS THAT OF ALLOCATION OF
FUNCTIONS BETWEEN MAN AND MACHINE. THIS PAPER
REPORTS AN ATTEMPT TO ISOLATE AND IDENTIFY FACTORS
PERTINENT TO MAKING ALLOCATION DECISIONS. FROM AN
ANALYSIS OF THE FUNCTIONS AND MISSIONS OF SEVERAL
AUTOMATED SYSTEMS, SIX FACTORS WERE SHOWN TO BE
HIGHLY RELEVANT TO ALLOCATION DECISIONS. ONE
FACTOR, MAN'S ROLE IN AUTOMATED SYSTEMS, EMERGED AS A
VARIABLE OF PARTICULAR INTEREST. IN ADDITION, FOUR
CLASSES OF MANUAL FUNCTIONS COMMON TO ALL AUTOMATED
SYSTEMS WERE IDENTIFIED. IT WAS DETERMINED THAT
THESE CLASSES, IN TURN, CONSTITUTED A MEANINGFUL
DESCRIPTION OF THE ROLE OF MAN IN TODAY'S AUTOMATED
SYSTEMS. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZC0463

AD-671 531 5/2 5/5 9/2
SYSTEM DEVELOPMENT CORP DAYTON OHIO
COMPUTERIZED HUMAN FACTORS TASK DATA HANDLING
TECHNIQUES. USER'S AND CONTROLLER'S OPERATING
GUIDES. (U)
DESCRIPTIVE NOTE: FINAL REPT. 30 JUN-31 OCT 67,
MAR 68 148P REARDON, SUE E. I
CONTRACT: F33615-67-C-1036
PROJ: AF-1710
TASK: 171006
MONITOR: AMRL TR-67-226

UNCLASSIFIED REPORT

DESCRIPTORS: (*HUMAN ENGINEERING, INFORMATION
RETRIEVAL), (*INFORMATION RETRIEVAL, *DATA
PROCESSING SYSTEMS), DATA STORAGE SYSTEMS,
INSTRUCTION MANUALS, PERSONNEL,
PERFORMANCE(HUMAN), HAZARDS, ERRORS, TIME
SHARING, TELETYPE SYSTEMS, DIGITAL COMPUTERS (U)
IDENTIFIERS: PROFILE MATCHING, AN/FSQ-32 (U)

INSTRUCTIONS ARE PRESENTED FOR THE OPERATION OF AN
EXPERIMENTAL COMPUTERIZED DATA HANDLING SYSTEM.
THESE INSTRUCTIONS WERE DEVELOPED AS PART OF THE
OVERALL RESEARCH INTO A USER-ORIENTED COMPUTERIZED
SYSTEM TO STORE, RETRIEVE, AND PROCESS HUMAN FACTORS
TASK DATA. THESE INSTRUCTIONS ARE INTENDED AS A
MODEL FOR FUTURE OPERATING GUIDES. (AUTHOR) (U)

UNCLASSIFIED

PROGRAMMED INSTRUCTION

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-282 679

AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATIONS IN COMPUTER-AIDED DESIGN FOR
NUMERICALLY CONTROLLED PRODUCTION

(U)

MAY 62 IV RUSS, D.T. COONS, S.A.I

REPT. NO. TR7 8201R 138
CONTRACT: AF33 600 42859
MONITOR: ASD TR7 820

UNCLASSIFIED REPORT

DESCRIPTORS: •AUTOMATIC, •DATA PROCESSING SYSTEMS,
•MACHINE TOOLS, •PROGRAMMING (COMPUTERS), ANALYSIS,
COMPUTERS, DESIGN, DISPLAY SYSTEMS, INSTRUMENTATION,
INTEGRATION, MECHANICAL ENGINEERING, NUMERICAL
ANALYSIS, OPERATORS (MATHEMATICS), OSCILLOSCOPES,
STRESSES

(U)

THE COMPUTER-AIDED DESIGN PROJECT IS ENGAGED IN A
PROGRAM OF RESEARCH INTO THE APPLICATION OF THE
CONCEPTS AND TECHNIQUES OF MODERN DATA PROCESSING TO
THE DESIGN OF MECHANICAL PARTS, AND THE FURTHER
DEVELOPMENT OF AUTOMATIC PROGRAMMING (APT) SYSTEMS
FOR NUMERICALLY CONTROLLED MACHINE TOOLS. THIS
COMBINED INTERIM REPORT COVERS THE FIFTEENTH
THROUGH TWENTY-SIXTH MONTHS OF THE PROJECT. TOPICS
COVERED INCLUDE: A DESCRIPTION OF CURRENT STATUS ON
THE BASIC BOOTSTRAP COMPILER, THE AVAILABLE PROGRAMS
OF THE BOOTSTRAP PLATEAU SYSTEM, AND THE MULTI-PASS
COMPILER; DISCUSSION OF A NEW FIRST-PASS ALGORITHM
WHICH IS BELIEVED TO HAVE WIDE APPLICABILITY TO ALL
FORMS OF PROBLEM STATEMENT; DESCRIPTIONS OF THREE
MANUAL INTERVENTION CONSOLE DESIGNS--A RUDIMENTARY
VERSION NOW OPERATING ON THE 709 COMPUTER, A PROPOSED
VERSION FOR THE 709, AND A STUDY OF A REMOTE CONSOLE
FOR A LARGE-SCALE CENTRAL COMPUTER; COMPUTER STUDIES
IN THREE-DIMENSIONAL SHAPE DESCRIPTION AND STRESS
ANALYSIS; AND PLANS FOR PILOT STUDIES IN PIN-JOINTED
TRUSSES AND SCULPTURED PARTS. (AUTHOR)

(U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-288 837

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

PROGRAMMED DECISIONS IN PROGRAMMED INSTRUCTION

(U)

AUG 62 1V COULSON, JOHN E.:

REPT. NO. SP 933 001 00

UNCLASSIFIED REPORT

DESCRIPTORS: •AUTOMATION, •EDUCATION, •TEACHING
MACHINES, DATA PROCESSING SYSTEMS, DIGITAL COMPUTERS,
HUMAN ENGINEERING, LEARNING, PROGRAMMING (COMPUTERS),
STUDENTS (U)

FLEXIBLE SEQUENCES KNOWN AS BRANCHING PROGRAMS ARE USED TO
ADAPT TEACHING MATERIALS TO INDIVIDUAL STUDENTS.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00443

AD-404 086

MITRE CORP BEDFORD MASS

PROGRAMMED INSTRUCTION. A SELECTED

BIBLIOGRAPHY,

APR 63 111P

MORRILL, C. S. ; HALPERT, D. T. ;

(U)

PILSUCK, S. H. ;

REPT. NO. SR69 1

CONTRACT: AF33 600 39852

PROJ: 702

MONITOR: ESD TDR62 225

UNCLASSIFIED REPORT

DESCRIPTORS: *EDUCATION, *PROGRAMMING COM
PUTERS, *BIBLIOGRAPHIES, AUTOMATION, TRAINING
DEVICES, DOCUMENTATION, TEACHING MACHINES,
READING, INSTRUCTORS,

(U)

BIBLIOGRAPHY OF REFERENCES ON PROGRAMMED INSTRUCTION.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-610 698

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
REMOTE COMPUTER USAGE: IMPLICATIONS FOR
EDUCATION.

(U)

DESCRIPTIVE NOTE: PROFESSIONAL PAPER,
JAN 65 13P ROWAN, T. C. ;
REPT. NO. SP-165J

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE 1964 TMS-ORSA
JOINT NATIONAL MEETING SEP 64.

DESCRIPTORS: (*EDUCATION, COMPUTERS), (*COMPUTERS,
EDUCATION), TEACHING MACHINES, SIMULATION, INFORMATION
RETRIEVAL, INSTRUCTORS, REMOTE CONTROL SYSTEMS,
CYBERNETICS

(U)

IDENTIFIERS: TIME SHARING (COMPUTERS), PROGRAMMED
INSTRUCTION

(U)

EXPERIMENTAL OPERATION OF COMPUTERS BY MULTIPLE
USERS LOCATED REMOTELY IS BEING EXTENDED WITH
INCREASING MOMENTUM INTO A VARIETY OF FIELDS.
PROBLEMS WITH EQUIPMENT, COMPUTER PROGRAMS, AND
OTHER SYSTEM ELEMENTS ARE BEING EXAMINED, AND
PRELIMINARY SOLUTIONS ARE BEING TESTED AND EVALUATED.
THE PAPER BRIEFLY REVIEWS THESE DEVELOPMENTS AND
DISCUSSES THE FOLLOWING AND SEVERAL OTHER IMPORTANT
IMPLICATIONS FOR EDUCATION: THE IMPACT ON CLASSROOM
PROCEDURES, CURRICULUM DESIGN, AND PROGRAMMED
INSTRUCTION; THE CONSEQUENT CENTRALIZATION OF
ADMINISTRATIVE SUPPORT AND EFFECTS ON LOCAL AUTONOMY;
THE RESULTING ACCELERATION IN THE INTRODUCTION OF
COMPUTERS IN TECHNICAL EDUCATION AT THE UNIVERSITY,
COLLEGE, AND SECONDARY-SCHOOL LEVEL. (AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZDC463

AD-630 981 5/9 9/2
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
EFFECTIVENESS OF PROGRAMMED INSTRUCTIONAL MATERIALS
DESIGNED TO INTEGRATE LOWER-LEVEL SUPPORTING
BEHAVIORS INTO HIGHER-LEVEL BEHAVIORS IN A LEARNING
PROGRAM FOR COMPUTER FLOW CHART DESIGN. (U)
DESCRIPTIVE NOTE: TECHNICAL BULLETIN (FINAL).
FEB 66 39P FORD, JOHN D., JR.:
MEYER, JOHN K.:
REPT. NO. STB-66-24,
PROD: PFO17030210,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-616 880.

DESCRIPTORS: (*PROGRAMMED INSTRUCTION, FLOW
CHARTING), (*FLOW CHARTING, TEACHING METHODS),
(*COMPUTERS, FLOW CHARTING), (*TRAINING,
PROGRAMMING(COMPUTERS)), DESIGN, APTITUDE
TESTS, BEHAVIOR, INSTRUCTION MANUALS,
LEARNING (U)
IDENTIFIERS: HIERARCHY, SYMBOLS (U)

THE STUDY SOUGHT TO EVALUATE A PRELIMINARY VERSION
OF A LEARNING PROGRAM DESIGNED TO TEACH COMPUTER FLOW
CHARTING. A METHOD SUGGESTED BY GAGNE WAS
APPLIED TO THE TASK OF DESIGNING COMPUTER FLOW
CHARTS. ANALYSIS BEGAN BY IDENTIFYING THE
SUPPORTING BEHAVIORS NEEDED TO PERFORM THE CRITERION
TASK. IT WAS IMPOSSIBLE TO OBTAIN A COMPLETE
HIERARCHICAL STRUCTURE FOR THE FLOW CHARTING TASK.
INSTRUCTIONAL MATERIALS WERE DEVELOPED FOR
VIRTUALLY ALL OF THE LEARNING SETS. THESE
MATERIALS COMPRISED THE BASIC OR CONTROL PROGRAM.
IN THE EXPERIMENTAL PROGRAM INTEGRATIVE
INSTRUCTIONAL MATERIALS WERE ADDED TO THE CONTROL
PROGRAM. EACH TRAINEE SPENT 15 HOURS ON A PROGRAM.
TRAINEE FLOW CHARTS WERE RATED ON THREE SKILLS,
(1) SYMBOLIC REPRESENTATION, (2) CONFIGURAL
DESIGN, AND (3) CONCEPTUAL FORMULATION.
MODERATE SUPPORT FOR A HIERARCHICAL TASK STRUCTURE
IS FOUND FOR THE SKILL AREA OF SYMBOLIC
REPRESENTATION. THE REMAINING TWO AREAS SEEM TO
CONFORM MUCH LESS TO A HIERARCHICAL ORGANIZATION.
IN ADDITION TO THE DATA OBTAINED BY RATINGS,
OBSERVATION OF TRAINEES WHILE THEY WORKED ON FLOW
CHART DESIGN PROBLEMS UNCOVERED PROCEDURAL OR PROCESS
BEHAVIORS WHICH CHARACTERIZED THE MORE SUCCESSFUL
TRAINEES. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-632 462 5/9
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
ANALYSIS OF INSTRUCTIONAL SYSTEMS. (U)
DESCRIPTIVE NOTE: FINAL REPT. (TECHNICAL MEMO.),
APR 66 267P COGSWELL, JOHN F. ;
BRATTEN, J. E. ; EGBERT, R. E. ; ESTAVAN, D. P. ;
YETT, F. A. ;
REPT. NO. TM-1493/201/00.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON NEW SOLUTIONS TO
IMPLEMENTING INSTRUCTIONAL MEDIA THROUGH ANALYSIS
AND SIMULATION OF SCHOOL ORGANIZATION. SEE ALSO
AD-427 752, AD-436 528, AD-620 663, PB-167 675,
PB-169 043.

DESCRIPTORS: (*EDUCATION, *TEACHING MACHINES),
(*PROGRAMMED INSTRUCTION, ANALYSIS), COMPUTERS,
STUDENTS, MODELS(SIMULATIONS),
PROGRAMMING(COMPUTERS), DATA PROCESSING SYSTEMS,
AUTOMATION, SCHEDULING, SIMULATION, LEARNING,
SYSTEMS ENGINEERING (U)
IDENTIFIERS: SCHOOLS, SYSTEMS ANALYSIS, EDSIM (U)

THE MAJOR FINDINGS INCLUDE THE IDENTIFICATION OF
TWO WAYS FOR USING SYSTEM ANALYSIS IN EDUCATION, THE
SPECIFICATION OF PROCEDURES FOR CONDUCTING ANALYSES
OF INSTRUCTIONAL SYSTEMS, AND IMPLICATIONS FOR SCHOOL
ORGANIZATION. ALTHOUGH THERE IS A DEFINITE TREND IN
SECONDARY EDUCATION TO SEARCH OUT AND INTRODUCE WAYS
TO ALTER SCHOOL ORGANIZATIONS SO THAT THE INDIVIDUAL
DIFFERENCES AMONG STUDENTS CAN BE ACCOMMODATED, NO
SCHOOL HAS YET EVOLVED AN ORGANIZATION TO
SUCCESSFULLY MEET THIS OBJECTIVE. SCHOOLS STRIVING
IN THIS DIRECTION ARE PRESENTLY BLOCKED BECAUSE THEY
LACK TWO MAJOR RESOURCES: (1) ADEQUATE SELF-
STUDY INSTRUCTIONAL MATERIALS, AND (2) ADEQUATE
SYSTEMS TO PROVIDE INFORMATION TO INSTRUCTORS,
COUNSELORS, AND ADMINISTRATORS ABOUT THE STATUS OF
STUDENTS AS INDIVIDUALS. RECOMMENDATIONS FOR
ATTACKING THESE PROBLEMS GROWING OUT OF THE STUDY
INCLUDE: (1) CONTINUED DEVELOPMENT OF THE
COMPUTER-BASED SYSTEM TO ASSIST STUDENTS AND
COUNSELORS IN ACADEMIC PLANNING THAT WAS STARTED IN
THE PROJECT; (2) CONTINUED STUDY OF THE USE OF
INFORMATION PROCESSING IN THE CLASSROOM TO DESIGN
SYSTEMS THAT WILL COLLECT, STORE, AND DISPLAY STUDENT
INFORMATION SO THAT IT CAN BE USED IN THE IMMEDIATE
INSTRUCTIONAL PROCESS; (3) IN-SERVICE TRAINING OF
INFLUENTIAL SCHOOL PERSONNEL IN THE SKILLS OF
DESIGNING INDIVIDUALIZED COURSE MATERIALS; AND (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-636 406 6/9
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
THE USE OF PROGRAMMED LEARNING AND COMPUTER BASED
INSTRUCTION TECHNIQUES TO TEACH ELECTRICAL
ENGINEERING NETWORK ANALYSIS. (U)
JUL 66 85P JOHNSON, ROGER L. I
REPT. NO. R-297,
CONTRACT: DA-28-043-AMC-000731E), NONR-3985(08)
PROJ: DA-20014501B31F;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROGRAMMED INSTRUCTION, *ELECTRICAL
ENGINEERING), COMPUTERS, LEARNING, STUDENTS,
EFFECTIVENESS, TEACHING METHODS, TRAINING,
PERFORMANCE(HUMAN), CIRCUITS, EFFECTIVENESS,
TEACHING MACHINES (U)
IDENTIFIERS: PLATO TEACHING SYSTEM (U)

TWO TYPES OF PROGRAMMED INSTRUCTION SEQUENCES
(INQUIRY AND TUTORIAL) WERE USED ON THE PLATO
SYSTEM TO TEACH ELECTRICAL NETWORK ANALYSIS (EE
322, UNIVERSITY OF ILLINOIS). TWO GROUPS OF
STUDENTS WERE SELECTED TO USE EACH OF THE TWO TYPES
OF INSTRUCTION. BOTH OF THE INSTRUCTION SEQUENCES
WERE TO PROVIDE THE SAME PERFORMANCE OBJECTIVES.
THE REPORT DESCRIBES THE DESIGN AND USE OF THE
INSTRUCTION ON THE PLATO TEACHING SYSTEM AND
SUMMARIZES THE PERFORMANCE OF THE STUDENTS WITH
RESPECT TO THE TWO METHODS OF TEACHING. THE STUDY
INDICATED THAT THE DESIRED PERFORMANCE OBJECTIVES
WERE OBTAINED SATISFACTORILY IN BOTH CASES,
ALTHOUGH IN CERTAIN ASPECTS THE INQUIRY TEACHING
PROGRAM EXHIBITED SOME ADVANTAGES. A TEACHING PROGRAM
WHICH COULD MAKE AVAILABLE ALL OF THE FACILITIES
CONTAINED IN THE PRESENT PROGRAMS WOULD BE MORE
DESIRABLE. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-638 676 5/9 9/2
ILLINOIS UNIV URBANA TRAINING RESEARCH LAB
PROJECT SOCRATES: A FLEXIBLE RESEARCH FACILITY TO BE
USED IN STUDIES OF PREPROGRAMED SELF-INSTRUCTION
(PSI) AND SELF-PROGRAMED INDIVIDUALIZED EDUCATION
(SPIE). (U)
DESCRIPTIVE NOTE: FINAL REPT.
SEP 66 31P STOLUDOW, LAWRENCE M. I
CONTRACT: NONR-3985(04);
PROJ: NR-154-239;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROGRAMMED INSTRUCTION, SCIENTIFIC
RESEARCH), (ED CATION, SCIENTIFIC RESEARCH),
(*TEACHING MACHINES, LEARNING), PSYCHOLOGY,
CYBERNETICS, TEACHING METHODS, STUDENTS,
COMPUTERS, BIBLIOGRAPHIES (U)
IDENTIFIERS: SOCRATES (U)

THIS IS THE FINAL REPORT OF WORK ACCOMPLISHED ON
PROJECT SOCRATES (SYSTEM FOR ORGANIZING
CONTENT TO REVIEW AND TEACH EDUCATIONAL
SUBJECTS). THE PROJECT CONTRIBUTED TO THE
DEVELOPMENT AND OPERATION OF A COMPUTER-BASED
FACILITY FOR PSYCHOLOGICAL RESEARCH ON VARIABLES
ASSOCIATED WITH PRE-PROGRAMED SELF-INSTRUCTION (PSI)
AND SELF-PROGRAMED INDIVIDUALIZED EDUCATION (SPIE).
THE RESEARCH WAS CONCERNED WITH THE DEVELOPMENT OF
PSYCHOLOGICAL THEORY AND RESEARCH RELATING TO THE
DESIGN AND USE OF A COMPUTER-BASED INSTRUCTIONAL
SYSTEM. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 100463

AD-638 891 5/9 18/5
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
COMPUTERIZED TRAINING INPUT PLAN FOR NUCLEAR
POWERPLANT OPERATORS. (U)
DESCRIPTIVE NOTE: RESEARCH REPT.
JUN 66 54P CONNER, RICHARD D. COLVIN, R.
L. I
REPT. NO: SRR-66-22,
PROJ: PFO16010904,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROGRAMMED INSTRUCTION, NUCLEAR
ENGINEERING); (*NUCLEAR POWER PLANTS,
OPERATORS(PERSONNEL)); NAVAL PERSONNEL,
TEACHING METHODS, COMPUTERS (U)

THE REPORT DESCRIBES THE DEVELOPMENT AND
APPLICATION OF A COMPUTERIZED MODEL FOR PLANNING A
CONTINUOUS, SUFFICIENT INPUT TO THE BASIC NUCLEAR
POWER SCHOOL, CLASS C. THE NAVY ENLISTED
CLASSIFICATION (NEC) CODE ASSIGNED TO PERSONNEL
DESIGNATED FOR THIS SCHOOL IS 99011 HENCE, THIS MODEL
IS REFERRED TO AS THE 9901 PLANNING MODEL. THIS
MODEL CONSIDERS FOUR DIFFERENT SOURCES OF STUDENT
INPUT, AND THEIR ASSOCIATED ATTRITION RATES, AND
PROGRAMS THE PERSONNEL INTO THE SCHOOL OVER A PERIOD
OF 22 CALENDAR QUARTERS (66 MONTHS). THE MODEL,
WHICH AUTOMATES ALL ASPECTS OF THE 9901 PLANNING
PROCEDURES, WILL NOT ONLY RELIEVE THE PRESENT
COMPUTATIONAL BURDEN AND ELIMINATE CALCULATION
ERRORS, BUT ALSO WILL PROVIDE RESULTS EARLIER IN THE
PLANNING PERIOD, THUS PERMITTING THE TESTING OF MANY
MORE POLICY ALTERNATIVES THAN IS POSSIBLE UNDER
CURRENT PROCEDURES. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-645 121 5/9
GENERAL ELECTRIC CO SANTA BARBARA CALIF TEMPO
COMPUTER AUGMENTED LEARNING, (U)
NOV 66 29P KINDRED, J. I
REPT. NO. 66TMP-55

UNCLASSIFIED REPORT

DESCRIPTORS: (*LEARNING, TRAINING DEVICES),
(*TRAINING DEVICES, COMPUTERS), (*TEACHING
MACHINES, COMPUTERS), (*PROGRAMMED INSTRUCTION,
LEARNING), EDUCATION, STUDENTS (U)

THE REPORT CONTAINS A DESCRIPTION AND SUMMARY OF
COMPUTER AUGMENTED LEARNING DEVICES AND SYSTEMS.
THE DEVICES ARE OF TWO GENERAL TYPES: PROGRAMMED
INSTRUCTION SYSTEMS BASED ON THE TEACHING MACHINES
PIONEERED BY PRESSEY AND DEVELOPED BY SKINNER,
AND THE SO-CALLED 'DOCILE' SYSTEMS THAT PERMIT
GREATER USER-DIRECTION WITH THE COMPUTER UNDER
STUDENT CONTROL. EVEN SYMPATHETIC CRITICISMS BY
PRACTITIONERS REVEAL LIMITED UNDERSTANDING OF THE
PSYCHOLOGY OF LEARNING AND KNOWING, EXPOSE POTENTIAL
RESTRICTIONS TO ADEQUATE SELECTION OF COMPUTER-BASED
CURRICULA, AND RECOGNIZE TECHNICAL HAZARDS THAT
IMPEDE THE DEVELOPMENT OF EFFECTIVE COMPUTERIZED
EDUCATIONAL TOOLS. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-646 651 5/9
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF
PSYCHOLOGY
TRAINING CORRECTIVE MAINTENANCE PERFORMANCE ON
ELECTRONIC EQUIPMENT WITH CAI TERMINALS: I. A
FEASIBILITY STUDY. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
DEC 66 41P RIGNEY, JOSEPH W. I
REPT. NO. TR-51
CONTRACT: NONR-228(22)
PROJ: NH-153-093

UNCLASSIFIED REPORT

DESCRIPTORS: (1) PROGRAMMED INSTRUCTION, ELECTRONIC
TECHNICIANS), FEASIBILITY STUDIES, PROGRAMMING
LANGUAGES, COMPUTERS, TESTS, LEARNING,
PERFORMANCE(HUMAN), ELECTRONIC EQUIPMENT (U)
IDENTIFIERS: COMPUTER-AIDED INSTRUCTION (U)

A REPORT IS GIVEN OF A FEASIBILITY STUDY IN WHICH
SEVERAL POSSIBLE RELATIONSHIPS BETWEEN STUDENT,
COMPUTER TERMINAL, AND ELECTRONIC EQUIPMENT WERE
CONSIDERED. THE SIMPLEST OF THESE CONFIGURATIONS
WAS SET UP AND EXAMINED IN TERMS OF ITS FEASIBILITY
FOR TEACHING THE PERFORMANCE OF FAULT LOCALIZATION ON
A NAVY TRANSCEIVER. AN INSTRUCTIONAL PROGRAM WAS
WRITTEN IN THE COURSEWRITER LANGUAGE. THE
PROGRAM GUIDES A STUDENT THROUGH A FAULT LOCALIZATION
STRATEGY DURING SEVERAL PRACTICE PROBLEMS, PROVIDING
KNOWLEDGE OF RESULTS AND REMEDIAL INSTRUCTION. IT
THEN RECORDS KEY STUDENT RESPONSES DURING THE
ADMINISTRATION OF TEST PROBLEMS. CONCLUSIONS OF THE
STUDY ARE: (1) SIMPLE CAI PROGRAMMING
LANGUAGES CAN BE QUICKLY LEARNED BY ELECTRONICS
INSTRUCTORS WHO ARE NOT TRAINED PROGRAMMERS; THESE
LANGUAGES MUST BE SUPPLEMENTED BY MORE POWERFUL
LANGUAGES IF THE FULL POTENTIAL OF CAI FOR
PERFORMANCE TRAINING IS TO BE REALIZED. (2)
COMPUTER-GUIDED PRACTICE IN FOLLOWING TROUBLE-
ISOLATION SEQUENCES CAN FACILITATE EFFECTIVE
TROUBLESHOOTING PERFORMANCE. EVEN A FEW HOURS OF
SUCH PRACTICE CAN SHOW INTERESTING RESULTS. (3)
THERE ARE SEVERAL ATTRACTIVE POSSIBILITIES FOR
COMBINING THE COMPUTER TERMINAL WITH ELECTRONIC
EQUIPMENT TO PROVIDE FOR ON-LINE SENSING OF STUDENT
ACTIONS ON THE EQUIPMENT. TWO MAJOR APPROACHES
EMERGE: CONSOLE-EQUIPMENT COMBINATIONS TO TEACH
PERFORMANCE ON SPECIFIC EQUIPMENT, AND CONSOLE-
EQUIPMENT COMBINATIONS TO TEACH GENERALIZABLE SKILLS,
SUCH AS ALIGNMENT PROCEDURES AND BRACKETING LOGIC. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZDD463

AD-647 407 5/9

RESEARCH ANALYSIS CORP MCLEAN VA
PROGRAMMED INSTRUCTION AND TEACHING MACHINES IN THE
FIELD OF MEDICAL EDUCATION: AN ANNOTATED
BIBLIOGRAPHY.

(U)

DESCRIPTIVE NOTE: TECHNICAL PAPER,
NOV 66 ZDP REYNOLDS, LAURA A. I
REPT. NO. RAC-TP-235

UNCLASSIFIED REPORT

DESCRIPTORS: (*MEDICAL PERSONNEL, EDUCATION),
(*MEDICINE, *PROGRAMMED INSTRUCTION), TEACHING
MACHINES, TEACHING METHODS, ABSTRACTS,
BIBLIOGRAPHIES, COMPUTERS, LEARNING

(U)

THE BIBLIOGRAPHY CONTAINS A SELECTED LIST OF
ARTICLES AND REPORTS, WITH ANNOTATIONS, REGARDING
PROGRAMMED INSTRUCTION AND TEACHING MACHINES IN THE
FIELD OF MEDICINE. AUTHORS' ABSTRACTS, WITH
OCCASIONAL MINOR CHANGES, ARE GIVEN WHERE AVAILABLE.
PAPERS THAT HAVE BEEN WRITTEN CONCERNING THE USE OF
COMPUTERS AS TEACHING MACHINES ARE INCLUDED.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-649 051 6/9 9/2 5/2
AMERICAN INSTITUTES FOR RESEARCH PITTSBURGH PA
DEVELOPMENT AND EVALUATION OF SELF-INSTRUCTIONAL
TEXTS AND AN OPERATIONAL SPECIFICATION FOR COMPUTER
DIRECTED TRAINING IN INTERMEDIATE QUERY LANGUAGE,
MODEL II, FOR SYSTEM 473L, UNITED STATES AIR FORCE
HEADQUARTERS. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
OCT 66 70P SLOUGH, DORIS CLAPP ;
YENS, DAVID P. INORTHRUP, JUDI L. ;
SHETTEL, HARRIS H. ;
CONTRACT: AF 19(628)-2935
PROJ: AF-7682
TASK: 768204
MONITOR: 650 TR-66-637

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROGRAMMED INSTRUCTION, *AIR FORCE
TRAINING), (*INFORMATION RETRIEVAL, PROGRAMMED
INSTRUCTION), (*COMMAND - CONTROL SYSTEMS,
INFORMATION RETRIEVAL), COMPUTERS,
EFFECTIVENESS, SPECIFICATIONS (U)
IDENTIFIERS: EVALUATION (U)

THE REPORT SUMMARIZES THE DEVELOPMENT AND
EVALUATION OF A PROGRAMED, SELF-INSTRUCTIONAL COURSE
FOR ON-THE-JOB TRAINING OF AIR STAFF PERSONNEL IN
THE USE OF INTERMEDIATE QUERY LANGUAGE, MODEL
II. THIS IS AN INFORMATION RETRIEVAL LANGUAGE
USED WITH THE COMPUTER BASED, AIR FORCE COMMAND
AND CONTROL SYSTEM, SYSTEM 473L. IN ADDITION,
IT DESCRIBES A COMPUTER DIRECTED TRAINING CAPABILITY
THAT WAS DESIGNED SPECIFICALLY TO USE SYSTEM 473L
ITSELF TO EFFECTIVELY AND EFFICIENTLY PROVIDE
TRAINING IN QUERY LANGUAGE. THE REPORT
DESCRIBES THE NEED FOR ON-THE-JOB TRAINING AND THE
RATIONALE FOR A COMPUTER DIRECTED TRAINING CAPABILITY
TO PROVIDE THIS TRAINING. IT DESCRIBES THE
DEVELOPMENT OF THE PROGRAMED TEXT, THE TEXT ITSELF,
AND THE EFFECTIVENESS OF THE TEXT MATERIALS BASED ON
TRYOUT DATA. FINALLY, A DESCRIPTION OF THE
PROPOSED COMPUTER DIRECTED TRAINING COURSE IS GIVEN,
WITH EMPHASIS ON THE TRAINING DESIGN. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-651 035 5/9
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE USE OF UNIVERSAL ELECTRONIC COMPUTERS FOR
PROGRAMMED INSTRUCTION, (U)
MAR 67 26P KORYAKOV, V. G. :
REPT. NO. FTD-MT-65-202
MONITOR: TT 67-61650

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: OB ISPOLZOVANII UNIVERSALNYKH
ELEKTRONNO-VYCHISLITEL'NYKH MASHIN DLYA
PROGRAMMIROVANNOGO OBUCHENIYA, EDITED MACHINE TRANS. OF
MONO. PROGRAMMIROVANNOE OBUCHENIE I KIBERNETICHESKIE
OBUCHAIUSHCHIE MASHINY, N. P. 1963 P. 39-59.

DESCRIPTORS: (*PROGRAMMED INSTRUCTION, DIGITAL
COMPUTERS), (*TEACHING MACHINES, DESIGN),
TRAINING, FILM READERS, AUTOMATIC, INPUT-
OUTPUT DEVICES, GERMAN LANGUAGE, RUSSIAN LANGUAGE,
USSR (U)

A DISCUSSION IS GIVEN OF CERTAIN RESULTS OF
EXPERIMENTAL APPLICATION OF DIGITAL COMPUTERS TO
PROGRAMMED LEARNING AND THE PRINCIPLES OF
CONSTRUCTING TEACHING SYSTEMS. THREE MODELS OF THE
TEACHING PROCESS ARE PRESENTED: PARALLEL,
SEQUENTIAL, AND BRANCHING. A BLOCK DIAGRAM IS
GIVEN FOR A TRAINING SYSTEM USING AN ELECTRONIC
COMPUTER, AND USE OF THE 'URAL-1' MACHINE WITH
ST-35 INSTRUMENTS AS INPUTS IS DISCUSSED FOR
TEACHING TRANSLATION FROM GERMAN TO RUSSIAN AND
DESIGN OF RADIO RECEIVERS. USE OF MULTIPURPOSE
COMPUTERS (UMSHN /UNIVERSALNAYA MASHINA
SHIROKOGO NAZNACHENIYA/) WITH AUTOMATIC FILM
VIEWERS AS OUTPUT DEVICES FOR STUDY OF RADIOTECHNICAL
CIRCUITS IS DESCRIBED. (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-651 052 5/9
GEORGE WASHINGTON UNIV ALEXANDRIA VA HUMAN RESOURCES
RESEARCH OFFICE
PROGRAMMED LEARNING: PROLOGUE TO INSTRUCTION, (U)
JAN 66 13P SEIDEL, ROBERT J. I
REPT. NO. PROFESSIONAL PAPER-17-67
CONTRACT: DA-44-188-ARD-2

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN PSYCHOLOGICAL REPORTS
V20 N1 P307-16 FEB 1967.

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
*LEARNING); REVIEWS; COMPUTERS; PSYCHOLOGY,
PROBLEM SOLVING (U)

THE PAPER INDICATES SOME PERTINENT ISSUES IN THE
FIELD OF PROGRAMMED INSTRUCTION (PI) AND SUGGESTS
PROMISING DIRECTIONS FOR FUTURE GROWTH OF PI, BOTH
AS A MEDIUM FOR THE APPLICATION OF PRINCIPLES OF
LEARNING AND AS A MEANS OF FURTHERING OUR
UNDERSTANDING OF LEARNING PROCESSES. PRACTICAL AND
THEORETICAL IMPLICATIONS ARE TOUCHED UPON AND
COMBINED TO GIVE A POSITION STATEMENT ON PI AS A
PEDAGOGICAL AND PSYCHOLOGICAL RESEARCH TOOL. IN
THIS VEIN THE UTILITY AND INEVITABILITY OF COMPUTER-
AIDED INSTRUCTION ARE DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-655 374 5/9 5/8
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS
LAB
INVESTIGATIONS IN COMPUTER-AIDED INSTRUCTION AND
COMPUTER-AIDED CONTROLS. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
APR 67 29P ROSENBERG, R. C. ;
MCCANDLISH, S. G. ; SHERIDAN, T. B. ;
CONTRACT: AF 19(628)-3317
PROJ: AF-7682, DSR-9960-4
TASK: 768204
MONITOR: ESD TR-67-289

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-640 681.

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
EFFECTIVENESS), TEACHING METHODS, COMPUTERS,
AUTOMATION, MAN-MACHINE SYSTEMS, TEACHING
MACHINES (U)

A SUMMARY IS PRESENTED OF TWO RESEARCH PROJECTS IN
THE AREA OF COMPUTER-AIDED INSTRUCTION AND MAN-
COMPUTER INTERACTION. IN 1965 ROSENBERG
COMPLETED A STUDY ENTITLED COMPUTER AIDED
TEACHING OF DYNAMIC SYSTEM BEHAVIOR (AD-640
681). THIS STUDY DEMONSTRATED THAT WITHIN THE
DELIMITED AREA OF FORMAL ENGINEERING THEORY A
COMPUTER SIMULATED LABORATORY COULD BE BUILT IN WHICH
FRESHMAN STUDENTS COULD POSE PROBLEMS, OBSERVE
DISPLAYS OF MACHINE RESPONSES, AND THEREBY LEARN
FORMAL DISCIPLINE WITH ONLY MINOR INTERACTION WITH A
HUMAN TEACHER. AN OUTLINE OF ROSENBERG'S
EXPERIMENT AND CONCLUSIONS IS GIVEN IN THIS REPORT,
ALONG WITH SOME MORE GENERAL 'OBSERVATIONS ON THE
USE OF COMPUTERS IN INSTRUCTION,' DEALING WITH
PROSPECTS FOR COMPUTERIZED TRACKING MONITORS. IN
JUNE 1966 MCCANDLISH COMPLETED A STUDY ENTITLED
A COMPUTER SIMULATION EXPERIMENT OF
SUPERVISORY CONTROL OF REMOTE MANIPULATION,
(TO BE PUBLISHED). MCCANDLISH SUMMARIZES
HOW, FOR A FORMALLY WELL-DEFINED TASK LIKE GRASPING A
BLOCK WITH A PAIR OF JAWS, REMOVING THE BLOCK FROM A
HOLE AND PLACING IT IN A SECOND HOLE, THE HUMAN CAN
PERFORM THE TASK THROUGH THE COMPUTER, BUT ONLY WITH
CERTAIN DIFFICULTIES. HE INVESTIGATED SUCH DISPLAY
RATE, TIME DELAY BETWEEN HUMAN RESPONSES AND
KNOWLEDGE OF RESULTS, AND NATURE OF COMMAND
STATEMENTS. AN OUTLINE OF MCCANDLISH'S
EXPERIMENT AND CONCLUSIONS IS GIVEN IN THIS REPORT
FOLLOWED BY 'OBSERVATIONS ON THE RELATION (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-656 613 6/9 4/1
GEORGE WASHINGTON UNIV ALEXANDRIA VA HUMAN RESOURCES
RESEARCH OFFICE
COMPUTER-ADMINISTERED INSTRUCTION VERSUS
TRADITIONALLY ADMINISTERED INSTRUCTION:
ECONOMICS, (U)
JUN 67 43P KOPSTEIN, FELIX F. ;
SEIDEL, ROBERT J. ;
REPT. NO. PROFESSIONAL PAPER 31-67
CONTRACT: DA-44-188-AR0-2
PROJ: DA-200247D1A712-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE NATIONAL SOCIETY
FOR PROGRAMMED INSTRUCTION, BOSTON, MASS., APRIL
1967.

DESCRIPTORS: (TEACHING METHODS, COST
EFFECTIVENESS), COMPUTERS, INSTRUCTORS,
PROGRAMMED INSTRUCTION, ECONOMICS, EDUCATION,
MILITARY TRAINING, PROGRAMMING(COMPUTERS) (U)

AN ATTEMPT IS MADE TO ASSAY THE ECONOMICS OF
COMPUTER-ADMINISTERED INSTRUCTION (CAI) VERSUS
TRADITIONALLY ADMINISTERED INSTRUCTION (TAI) IN
CONTROLLING THE STRUCTURE OF THE LEARNER'S STIMULUS
ENVIRONMENT IN TEACHING AND TRAINING SITUATIONS.
THERE IS A DISCUSSION OF THE NEED FOR A SOUND,
OBJECTIVE ECONOMIC APPRAISAL OF THE VALUE TO SOCIETY
AS A WHOLE OF INCREMENTS IN THE BREADTH AND DEPTH OF
EDUCATION IN THE POPULATION, AND OF THE INFLUENCE OF
VARYING RATES WITH WHICH THESE INCREMENTS ARE BROUGHT
ABOUT. THE NECESSITY FOR RELIABLE, OBJECTIVE
INFORMATION CONCERNING COST DATA IS EMPHASIZED.
PROJECTED COST/EFFECTIVENESS COMPARISONS BASED ON
THE ASSUMPTION OF EQUAL EFFECTIVENESS FOR CAI AND
TAI ARE DISCUSSED FOR BOTH CIVILIAN AND MILITARY
INSTRUCTION. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-657 190 5/9 12/2
STANFORD UNIV CALIF INST IN ENGINEERING-ECONOMIC
SYSTEMS
QUANTITATIVE METHODS IN COMPUTER-DIRECTED TEACHING
SYSTEMS. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
MAR 6 1971 SMALLWOOD, RICHARD D. ;
WEINSTEIN, RALPH J. ; ECKLES, JAMES F. ;
CONTRACT: NONR-225(84)

UNCLASSIFIED REPORT

DESCRIPTORS: (*EDUCATION, SYSTEMS ENGINEERING),
(*TEACHING METHODS, SYSTEMS ENGINEERING),
PROGRAMMED INSTRUCTION, MATHEMATICAL MODELS,
LEARNING, DECISION MAKING, DYNAMIC PROGRAMMING,
DECISION THEORY, OPTIMIZATION, TIME SHARING,
COMPUTERS, OPERATIONS RESEARCH (U)

THE REPORT FORMULATES IN QUANTITATIVE TERMS THE
DECISION PROBLEM ASSOCIATED WITH THE DESIGN OF A
COMPUTER-DIRECTED TEACHING SYSTEM. THIS
FORMULATION IS THEN USED TO DIRECT A THEORETICAL
INQUIRY INTO SOME OF THE ASPECTS OF THIS PROBLEM THAT
ARE RELEVANT TO THE DESIGN OF A QUANTITATIVE DECISION
PROCESS WITHIN A PRACTICAL TEACHING SYSTEM. SOME
OF THE PROBLEMS ATTACKED INCLUDE: THE DEVELOPMENT
OF A CLASS OF MODELS FOR CONCEPTUAL LEARNING, THE
STUDY OF A DECISION THEORETIC PROCEDURE FOR THE
SELECTION OF THE MODEL FROM A CLASS OF MODELS, THE
INVESTIGATION OF OPTIMUM TEACHING STRATEGIES (IN AN
ECONOMIC SENSE) FOR A SIMPLE LEARNING MODEL, THE
DERIVATION OF THE OPTIMUM QUANTIZATION OF A PAST
HISTORY PARAMETER FOR A SIMPLE TEACHING SYSTEM, A
CONSIDERATION OF THE INFORMATION-REWARD TRADE OFF IN
COMPUTER-DIRECTED TEACHING SYSTEMS, AND A PRELIMINARY
FORMULATION OF THE OPTIMUM DESIGN PROBLEM FOR A TIME-
SHARED TEACHING SYSTEM. THE REPORT CONCLUDES WITH
A DISCUSSION OF DIRECTIONS FOR FUTURE RESEARCH.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZDD4A3

AD-657 384 5/7
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ACOUSTICS
PHONETICS RESEARCH LAB
STUDIES IN THE PHONOLOGY OF ASIAN LANGUAGES. V.
ACOUSTIC FEATURES IN THE MANNER-DIFFERENTIATION OF
KOREAN STOP CONSONANTS. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT. JUL 66-JUL 67,
JUL 67 57P HAN, MIEKO S. I
WEITZMAN, RAYMOND S. I
CONTRACT: N0NR-2281281
PROJ: NR-049-183

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-637 827.

DESCRIPTORS: (LANGUAGE, ASIA), (PHONETICS,
ANALYSIS), SPEECH, ACOUSTICS, SPEECH
REPRESENTATION (U)
IDENTIFIERS: KOREAN LANGUAGE (U)

IN KOREAN NINE STOP CONSONANTS--THE ASPIRATED
BILABIAL, DENTAL, AND VELAR STOPS; THE WEAK BILABIAL,
DENTAL, AND VELAR STOPS; AND THE STRONG BILABIAL,
DENTAL, AND VELAR STOPS--CONTRAST WITH EACH OTHER.
IN ORDER TO DETERMINE THOSE ACOUSTIC FEATURES
INVOLVED IN THE MANNER DIFFERENTIATION OF THESE
STOPS, A FAIRLY LARGE AMOUNT OF DATA WAS COLLECTED,
AND A NUMBER OF SPEECH SYNTHESIS EXPERIMENTS WERE
CARRIED OUT USING THE TAPE CUTTING AND SPLICING
METHOD. THESE STUDIES REVEALED THAT ASPIRATED
STOPS ARE DISTINGUISHED FROM WEAK AND STRONG STOPS
PRIMARILY BY THE TIMING OF THE VOICE ONSET.
ASPIRATED STOPS WERE FOUND TO BE 2.4 TO 5.3 TIMES
LONGER THAN WEAK STOPS AND EVEN LONGER THAN THIS
COMPARED TO STRONG STOPS. THE CUES FOR THE
DISTINCTION BETWEEN WEAK AND STRONG STOPS SEEM TO BE
(1) THE INTENSITY BUILDUP IN THE FIRST FEW
CENTISECONDS OF VOICING FOLLOWING STOP RELEASE, WHICH
IS GENERALLY SLOWER WITH WEAK STOPS THAN WITH STRONG
STOPS AND (2) THE PEAK AMPLITUDE OF THE FIRST
PERIOD OF VOICING. THESE FINDINGS INDICATE THAT
THE DIFFERENCE BETWEEN THESE STOPS IS A FUNCTION OF
THE SLOPE OF THE LEADING EDGE OF THE INTENSITY
CONTINUANT DURING THE FIRST FEW CENTISECONDS OF VOICING
FOLLOWING THE STOP RELEASE. RELATIVE TO A GIVEN
SPEAKER, IF THE SLOPE RISES ABRUPTLY, THE STOP WILL
BE HEARD AS STRONG, AND IF IT RISES GRADUALLY, THE
STOP WILL BE HEARD AS WEAK. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z00463

AD-658 869 5/9 9/2
HARVARD COMPUTING CENTER CAMBRIDGE MASS
COMPUTER-ASSISTED INSTRUCTION (CAI). (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 67 86P STOLURON, LAWRENCE M. I
REPT. NO: TR-2
CONTRACT: N00014-67-A-3298

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
*COMPUTERS), PROBLEM SOLVING, TEACHING
METHODS, THEORY, MULTIPLE OPERATION, STUDENTS,
EDUCATION (U)
IDENTIFIERS: COMPUTER-AIDED INSTRUCTION (U)

THE PURPOSES OF CAI ARE DESCRIBED. FIVE MODES
OF USE ARE DESCRIBED: PROBLEM SOLVING; DRILL AND
PRACTICE; SIMULATION AND GAMING; TUTORIAL
INSTRUCTION; AND AUTHOR. THE MULTI-MEDIA CHARACTER
OF CAI IS DESCRIBED. A MODEL OF CAI IS
DEVELOPED; IT IS THE IDIOGRAPHIC CONTINGENCY MODEL
(ICM). THE MODEL TREATS INSTRUCTION AS A
MULTIPLE DECISION PROCESS. THE FIRST IS THE
PRETUTORIAL; THE SECOND IS THE TUTORIAL PROCESS; THE
THIRD PROCESS CONCERNED WITH MAINTAINING OR
CHANGING THE TEACHING PROGRAM BY ALTERING THE
TEACHING STRATEGY (LOGIC). IMPLICATIONS FOR
CURRICULUM PLANNING, MAN-MACHINE RELATIONS, OPERATION
AND ASSESSMENT AND EVALUATION ARE DISCUSSED.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZD0463

AD-658 873 5/9 9/2
HARVARD COMPUTING CENTER CAMBRIDGE MASS
THE HARVARD UNIVERSITY COMPUTER-ASSISTED INSTRUCTION
LABORATORY. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 67 24P STOLUROW, LAWRENCE M. I
REPT. NO. TR-1
CONTRACT: N00014-67-A-0298

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
*COMPUTERS), TIME SHARING, EDUCATION,
PROBLEM SOLVING, LABORATORIES, COMPUTER
PERSONNEL, FEASIBILITY STUDIES, MANAGEMENT
PLANNING (U)
IDENTIFIERS: COMPUTER-AIDED INSTRUCTION (U)

THE REPORT DESCRIBES THE PURPOSE, ORGANIZATION AND
PLAN OF THE HARVARD CAI LABORATORY.
(AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 203463

AD-666 303 5/9 9/2
IBM FEDERAL SYSTEMS DIV GAITHERSBURG MD
COMPUTER-ASSISTED INSTRUCTION FOR THE NATIONAL
MILITARY COMMAND SYSTEM INFORMATION PROCESSING SYSTEM
(CAINIPS). (U)
DESCRIPTIVE NOTE: FINAL REPT.,
FEB 68 374P CARMODY, R. W. ;
CONTRACT: DCA-100-67-C-0037
MONITOR: NMCS SC TR-15-68

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
COMPUTERS); TEACHING METHODS; TRAINING;
EXPERIMENTAL DESIGN; STUDENTS; LEARNING;
EFFECTIVENESS; COSTS; ANALYSIS OF VARIANCE;
COMPUTER LOGIC (U)
IDENTIFIERS: *COMPUTER AIDED INSTRUCTION,
INFORMATION PROCESSING; NATIONAL MILITARY
COMMAND SYSTEM INFORMATION PROCESSING
SYSTEM (U)

THE PAPER DESCRIBES AN EXPERIMENT WHICH UTILIZED A
COMPUTER-BASED INSTRUCTIONAL SYSTEM TO TEACH A
SEGMENT OF THE NIPS TRAINING PROGRAM.
DESCRIPTIONS OF THE PROJECT DESIGN, PROJECT
IMPLEMENTATION, AND PROJECT RESULTS AND DISCUSSION
ARE INCLUDED. THE RESULTS OF THIS EXPERIMENT HAVE
DEMONSTRATED THAT A COMPUTER-BASED INSTRUCTIONAL
SYSTEM COULD BE USED TO TEACH STUDENTS SIGNIFICANTLY
BETTER, AND IN LESS TIME, THAN THE CONVENTIONAL
LECTURE INSTRUCTION FOR THIS SEGMENT OF THE NIPS
TRAINING PROGRAM. ALSO INCLUDED ARE RESULTS OF AN
INVESTIGATION OF METHOD/MEDIA INTERACTIONS WITHIN THE
COMPUTER-BASED INSTRUCTIONAL SYSTEM. THESE RESULTS
CAN BE USED TO DESIGN AND IMPLEMENT A MORE ADAPTIVE
COMPUTERIZED TRAINING PROGRAM. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZDD483

AD-672 187 5/9 5/2 9/2
HARVARD COMPUTING CENTER CAMBRIDGE MASS
A COMPUTER-BASED SYSTEM INTEGRATING INSTRUCTION AND
INFORMATION RETRIEVAL: A DESCRIPTION OF SOME
METHODOLOGICAL CONSIDERATIONS. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 68 44P SELIG, JUDITH A. ;
REINECKE, ROBERT D. ; STOLUROW, LAWRENCE M. ;
REPT. NO. TR-5
CONTRACT: N00014-67-A-0298

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
*INFORMATION RETRIEVAL), TEACHING METHODS,
BIBLIOGRAPHIES, SYSTEMS ENGINEERING, DATA
STORAGE SYSTEMS, TEACHING MACHINES,
PROGRAMMING (COMPUTERS), OPHTHALMOLOGY (U)
IDENTIFIERS: *COMPUTER AIDED INSTRUCTION, SUBJECT
INDEX TERMS, IBM 7010 COMPUTERS, IBM 1401
COMPUTERS (U)

THE WORK INCLUDES THE DEVELOPMENT OF A CONCORDANCE
AND THE CONVERSION OF THE PROGRAMMED TEXTBOOK BASIC
OPHTHALMOLOGY, BY ROBERT D. REINECKE,
M.D. AND ROBERT J. HERM, M.D., TO
COMPUTER-ASSISTED INSTRUCTION ON THE IBM 7010 AND
IBM 1401 SYSTEMS. ESSENTIALLY THE REPORT
DESCRIBES THE METHODOLOGY USED TO LOAD A LARGE BODY
OF TEXT ONTO A COMPUTER. AN EFFORT WAS MADE TO
DOCUMENT AND EXPLAIN ALL STEPS, INCLUDING THOSE WHICH
WERE ABANDONED, IN ORDER TO AVOID UNNECESSARY
DUPLICATION IN THE FUTURE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZDD463

AD-672 189 5/9
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONICS
PERSONNEL RESEARCH GROUP
COMPUTER-AIDED TECHNICAL TRAINING USING ELECTRONIC
EQUIPMENT ON-LINE WITH THE CAI SYSTEM. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 68 41P HUGGETT, GEOFFREY ;
DAVIS, DANIEL J. IRIGNEY, JOSEPH W. ;
REPT. NO. TR-59
CONTRACT: NONR-228(22)
PROJ: NR-153-093

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH
ILLINOIS UNIV., URBANA. COMPUTER-BASED
EDUCATION RESEARCH LAB.

DESCRIPTORS: (*PROGRAMMED INSTRUCTION,
MAINTENANCE PERSONNEL), TRANSMITTER-RECEIVERS,
MAINTENANCE, RADIO COMMUNICATION SYSTEMS,
TEACHING METHODS, STUDENTS, CORRECTIONS,
COMPUTER (U)

IDENTIFIERS: *COMPUTER AIDED INSTRUCTION, AN/
URC-32, TROUBLESHOOTING, ON-LINE SYSTEMS,
PLATO TEACHING SYSTEM (U)

THE REPORT DESCRIBES AN EXPERIMENTAL COURSE IN THE
OPERATION AND TROUBLESHOOTING OF A COMMUNICATIONS
TRANSCIVER, THE AN/URC-32, IN WHICH THE
TRANSCIVER IS USED AS PART OF AN INSTRUCTIONAL
STATION IN A CAI SYSTEM. THE TRANSCIVER AND THE
CAI SYSTEM ARE HARD-WIRED TOGETHER TO FORM A SINGLE
TRAINING SYSTEM. THE SYSTEM IS PRESENTLY OPERATING
IN THE COMPUTER-BASED EDUCATION RESEARCH
LABORATORY OF THE UNIVERSITY OF ILLINOIS. A
STUDENT'S OPERATION OF SWITCHES ON THE TRANSCIVER
FRONT PANEL IS SENSED BY THE CAI SYSTEM. THE
CAI SYSTEM CAN INSERT AND REMOVE MALFUNCTIONS IN
THE TRANSCIVER UNDER PROGRAM CONTROL. THIS ALLOWS
PRACTICE IN OPERATING AND TROUBLESHOOTING THE
EQUIPMENT TO BE COORDINATED WITH THE PRESENTATION OF
TECHNICAL INFORMATION IN THE LESSONS. THE STUDENT
IS REQUIRED TO PUT HIS KNOWLEDGE OF THIS INFORMATION
TO IMMEDIATE USE IN SOLVING TROUBLESHOOTING PROBLEMS.
THE REPORT DESCRIBES THE INITIAL IMPLEMENTATION OF
THE ABOVE FEATURES. (AUTHOR) (U)

UNCLASSIFIED

NETWORK AND SWITCHING SYSTEMS THEORY

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-255 842

AIR FORCE CAMBRIDGE RESEARCH LABS L G HANCOM FIELD
MASS

MINIMAL SYNTHESIS OF THE WYE-FORM TWO-OUTPUT
SWITCHING NETWORK

(U)

JAN 61 IV PETRICK, S.R.;

REPT. NO. 109

MONITOR: AFCL 109

UNCLASSIFIED REPORT

DESCRIPTORS: *SWITCHING CIRCUITS, CIRCUITS,
COMPUTERS, ELECTRICAL NETWORKS, MATHEMATICAL ANALYSIS,
SYNTHESIS (U)

THE PROBLEM TREATED IS THE SIMULTANEOUS
MINIMIZATION OF THREE BOOLEAN FUNCTIONS X , Y , AND
 Z SUCH THAT IF F_1 AND F_2 ARE ANY TWO GIVEN
BOOLEAN FUNCTIONS WE HAVE $F_1 = XY$ AND $F_2 =$
 XZ . IN SWITCHINGCIRCUIT TERMINOLOGY THE PROBLEM
CONSISTS OF SYNTHESIZING A MINIMAL WYE- Y NETWORK
TO REALIZE TWO ARBITRARY SWITCHING FUNCTIONS. BY
REDUCING THE GIVEN TWO-OUTPUT PROBLEM TO AN
EQUIVALENT SINGLE-OUTPUT PROBLEM, THE REQUIRED
MINIMAL SYNTHESIS PROCEDURE IS FOUND FOR THE CASE
WHERE EACH OF THE FUNCTIONS X , Y , AND Z IS
RESTRICTED TO BE OF THE PRODUCT-OF-SUMS FORM.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 220463

AD-257 822

SYRACUSE UNIV N Y

TIME RESPONSE CHARACTERISTICS OF LINEAR NETWORKS AND
TRANSFORMATION METHODS IN NETWORK SYNTHESIS (U)

MAY 61 1V BRULE, JOHN D. ISHCH, B.P.?

REPT. NO. EE745 61572

CONTRACT: AF19 604 6142

MONITOR: AFRL 146 V2

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRICAL NETWORKS, *OPTICAL
EQUIPMENT, DIFFERENTIAL EQUATIONS, DIGITAL COMPUTERS,
FUNCTIONS, LEAST SQUARES METHOD, MATHEMATICAL
ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS, PROGRAMMING
(COMPUTERS), SYNTHESIS, TAYLOR'S SERIES, TRANSIENT,
VECTOR ANALYSIS (U)

AN ATTEMPT HAS BEEN MADE TO USE THE CRITERION OF
LEAST-SQUARED ERROR TO DETERMINE ANALYTICALLY THE
SHIFTS OF THE LOCATION OF THE POLES AND RESIDUES OF
A TRANSFER FUNCTION IN ORDER TO MEET A TIME DOMAIN
SPECIFICATION. A FIRST APPROXIMATION IS OBTAINED
WITH THE HELP OF EXISTING METHODS, AND SUCCESSIVE
STEPS ARE CARRIED OUT USING THE FIRST TWO TERMS OF
THE TAYLOR SERIES EXPANSION OF THE FIRST
APPROXIMATION. IN THE PROCESS, ORTHOGONAL VECTOR
FUNCTIONS ARE FORMED BY LINEAR COMBINATIONS OF THE
PARTIAL DERIVATIVE FUNCTIONS. THE USE OF FORTRAN
FOR PROGRAMMING THE PROBLEM FOR THE IBM 650 DATA
PROCESSING MACHINE IS ILLUSTRATED. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-259 786

REMINGTON RAND UNIVAC DIV SPERRY RAND CORP PHILADELPHIA
PA

MATHEMATICAL CIRCUIT ANALYSIS AND DESIGN (U)
IV BROWN, ALBERT HULLS, L. ROBIN;

CONTRACT: AF19 604 5189

MONITOR: AFRL 191

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *INVERTER CIRCUITS, DESIGN,
DIGITAL COMPUTERS, DIODES, INEQUALITIES, MATHEMATICAL
ANALYSIS, NUMERICAL METHODS AND PROCEDURES, PARTIAL
DIFFERENTIAL EQUATIONS, PROGRAMMING (COMPUTERS),
RELAXATION OSCILLATORS, STATISTICAL ANALYSIS,
STATISTICAL DISTRIBUTIONS, TRANSISTORS (U)

MATHEMATICAL TECHNIQUES ARE APPLIED TO THE ANALYSIS
OF THE STEADY-STATE PERFORMANCE OF A TRANSISTOR GATE-
INVERTER CIRCUIT. THE STATISTICAL CALCULATION OF
CIRCUIT BEHAVIOR IS DISCUSSED AND RESULTS ARE
PRESENTED FOR THE COMPUTER ANALYSIS OF A TYPICAL
CIRCUIT. A DETAILED MATHEMATICAL DESCRIPTION OF
THE TECHNIQUE FOR DETERMINING THE MAXIMUM COMPONENT
TOLERANCE IS INCLUDED AND THE SUBSEQUENT STATISTICAL
STUDY INDICATES THE IMPORTANCE OF THE MAXIMUM
TOLERANCE DETERMINATION IN CIRCUIT DESIGN.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-261 923

POLYTECHNIC INST F BROOKLYN N Y MICROWAVE RESEARCH
INST

A NEW THEORY OF CASCADE SYNTHESIS

(U)

DESCRIPTIVE NOTE: RESEARCH REPT.

MAY 61 40P YOCULA, D.C. 1

REPT. NO. PIB-MRI-916-61

CONTRACT: AF19 604 4143

MONITOR: AFRL 514

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *ELECTRIC FILTERS,
*ELECTRICAL NETWORKS, *RADIOFREQUENCY FILTERS, COMPLEX
VARIABLES, DIGITAL COMPUTERS, MATHEMATICAL ANALYSIS,
PROGRAMMING (COMPUTERS), SYNTHESIS (U)

A NEW RESULT IS PRESENTED GENERALIZING RICHARD'S
THEOREM. IT IS THEN SHOWN THAT THIS RESULT LEADS
TO A COMPLETE, SIMPLE AND UNIFIED THEORY OF CASCADE
SYNTHESIS WHICH YIELDS THE TYPES A, B, BRUNE, C
AND D SECTIONS IN A DIRECT AND NATURAL MANNER.
THE ELEMENT VALUES OF THE VARIOUS SECTIONS ARE
OBTAINED IN CLOSED FORM IN TERMS OF THREE OF SIX
INDICES. THUS THE EXTRACTION CYCLE IS PERFORMED
ONCE AND FOR ALL FOR THE WHOLE CLASS OF POSITIVE-REAL
FUNCTIONS. SEVERAL PROBLEMS ARE WORKED OUT IN
DETAIL AND A CHART IS CONSTRUCTED TO FACILITATE THE
COMPUTATIONS. THE FORMULAS ARE EASILY PROGRAMMED
ON A DIGITAL COMPUTER. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 2E04A3

AD-263 119

SYRACUSE UNIV N Y

TIME RESPONSE CHARACTERISTICS OF LINEAR NETWORKS AND
TRANSFORMATION METHODS IN NETWORK SYNTHESIS (U)

AUG 61 14 BROLE, JOHN D.; JOHNSON, RICHARD A.

REPT. NO. EE745 6109F1

CONTRACT: AF19 604 6142

MONITOR: AFRL 186 P1

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *DATA PROCESSING SYSTEMS,
*ELECTRICAL NETWORKS, *LINEAR SYSTEMS, ANALOG
COMPUTERS, COMPUTER STORAGE DEVICES, DATA STORAGE
SYSTEMS, ELECTRIC FILTERS, MATHEMATICAL PREDICTION,
NUMERICAL ANALYSIS, POLYNOMIALS, SAMPLING, SYNTHESIS,
TRANSFORMATIONS (MATHEMATICS) (U)

THE EFFECTS OF LINEAR NETWORKS ON VARIOUS TYPES OF
SIGNALS, AND APPROXIMATION METHODS ARE CONSIDERED.
A SYSTEMATIC MEANS IS DISCUSSED TO CHANGE A GIVEN
RATIONAL TRANSFER FUNCTION SUCH THAT ITS IMPULSE
RESPONSE APPROXIMATES A GIVEN TIME FUNCTION WITH
REDUCED INTEGRAL SQUARED ERROR. TRANSFORMATION
METHODS ARE PRESENTED THAT ARE OF USE IN NETWORK
SYNTHESIS. IN MANY PROBLEMS OF INTEREST, A TIME
DOMAIN REPRESENTATION OF THE NETWORKS UNDER
CONSIDERATION MAY YIELD A BETTER INSIGHT INTO THE
CHARACTERISTICS DESIRED THAN A FREQUENCY DOMAIN
REPRESENTATION. FOR EXAMPLE, IN POLYNOMIAL
EXTRAPOLATION OF SAMPLED DATA IT IS USEFUL TO
CONSIDER THE EXTRAPOLATION PROCESS AS A FINITE MEMORY
FILTER OPERATING ON THE INPUT DATA. THE OUTPUT OF
THIS FILTER IS MOST READILY STUDIED BY CONSIDERING
ITS TIME DOMAIN CHARACTERISTICS, RATHER THAN ITS
FREQUENCY DOMAIN REPRESENTATION. THE TIME DOMAIN
REPRESENTATION IS EXPLOITED HEREIN WHEN THE INPUT
SIGNAL IS DETERMINISTIC, AND ALSO WHEN IT IS
DESCRIBED IN TERMS OF AN AUTOCORRELATION FUNCTION.
MUCH OF THE WORK THAT IS DONE IS CONCERNED WITH
FINITE MEMORY FILTERS, AND A STUDY IN THE TIME DOMAIN
IS FOUND TO BE MOST USEFUL IN THIS CASE.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-266 580

NATIONAL BIOMEDICAL RESEARCH FOUNDATION SILVER SPRING
MD

COLLECTED PAPERS ON SWITCHING CIRCUIT THEORY AND
LOGICAL AND SYSTEMS DESIGN (U)

OCT 61 IV LEDLEY, ROBERT S. BOYLE, DON R. I

WILSON, JAMES B. I

CONTRACT: NONR326500

UNCLASSIFIED REPORT

DESCRIPTORS: *DIGITAL SYSTEMS, *SWITCHING CIRCUITS,
*SYNCHRONIZATION (ELECTRONICS), ALGEBRA, AUTOMATIC,
CIRCUITS, COMPUTER LOGIC, COMPUTER STORAGE DEVICES,
COMPUTERS, CYBERNETICS, DATA STORAGE SYSTEMS, DESIGN,
DIGITAL COMPUTERS, ELECTRICAL NETWORKS, MATHEMATICAL
LOGIC, MATRIX ALGEBRA, MEMORY, PROGRAMMING
(COMPUTERS), PULSE COMMUNICATION SYSTEMS, SEQUENCES,
TABLES, THEORY, TIME, TRANSFORMATIONS
(MATHEMATICS) (U)

CONTENTS: BOOLEAN MATRICES APPLIED TO SEQUENTIAL
CIRCUIT THEORY AND THRESHOLD LOGICS MULTIVALUED
LOGIC DEVICES FOR SIMULATING THRESHOLD NEURONS
ORGANIZATION OF LARGE MEMORY SYSTEMS AN
ALGORITHM FOR RAPID BINARY DIVISION (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZEG463

AD-268 906

DAVID SARNOFF RESEARCH CENTER PRINCETON N J
MAJORITY LOGIC BY GEOMETRIC METHODS

(U)

JUL 61 1V MILLER, H.S. WINDER, R.O. I

REPT. NO. SR4

CONTRACT: AF19 604 8423

MONITOR: AFCRL 792

UNCLASSIFIED REPORT

DESCRIPTORS: •ALGEBRAIC GEOMETRY; •COMPUTER LOGIC,
•ELECTRICAL NETWORKS, COMPUTERS, FUNCTIONS, SWITCHING
CIRCUITS, SYNTHESIS

(U)

IDENTIFIERS: M-61 GUNS, 20-MM

(U)

THE USEFULNESS OF A GEOMETRIC APPROACH TO THE
FOLLOWING PROBLEM IS PRESENTED: GIVEN AN N-ARGUMENT
SWITCHING FUNCTION AND 1-INPUT MAJORITY GATES AS
BUILDING BLOCKS, DEVISE A NETWORK WHICH REPRESENTS
THE GIVEN FUNCTION. THIS PROBLEM HAS BEEN TREATED
ALGEBRAICALLY. TWO-LEVEL REALIZATIONS WILL BE
DERIVED, AND PROBLEMS WITH LARGER VALUES OF N AND ;
ARE CONSIDERED. IN THESE CASES, MULTI-LEVEL
REALIZATIONS MUST BE PERMITTED. THE SYNTHESIS
PROCEDURES DESCRIBED EMPLOY GEOMETRIC INTUITION
(NAMELY, MATCHING KNOWN PATTERNS WITH GIVEN
PATTERNS), AND DO NOT GUARANTEE OPTIMAL SOLUTIONS.
(AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-273 849

STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
OPERATOR METHODS FOR PIECEWISE-LINEAR NETWORK
ANALYSIS

(U)

IV ROTH, C.H.:

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *ELECTRICAL NETWORKS,
*OPERATORS (MATHEMATICS), ANALYSIS, DIGITAL COMPUTERS,
DIODES, ELECTRON TUBES, LINEAR SYSTEMS, MATHEMATICAL
ANALYSIS, PROGRAMMING (COMPUTERS), THEORY,
TRANSISTORS

(U)

EFFORTS WERE MADE TO DEVELOP SYSTEMATIC METHODS FOR
THE ANALYSIS OF NETWORKS THAT CONTAIN PIECEWISE-
LINEAR (PWL) ELEMENTS. A GENERAL METHOD WAS
DEVELOPED FOR ANALYSIS OF RESISTIVE PWL NETWORKS,
AND SPECIAL CASES OF PWL NETWORKS CONTAINING
REACTIVE ELEMENTS WERE SOLVED. AS A MORE
SYSTEMATIC METHOD SUITABLE FOR USE WITH A DIGITAL
COMPUTER, THE PWL-OPERATOR METHOD WAS DEVELOPED.
PWL OPERATORS ARE DEFINED TO REPRESENT THE
CHARACTERISTIC CURVES OF PWL ELEMENTS. THE BASIC
ALGEBRAIC OPERATIONS ARE DEFINED FOR PWL OPERATORS
AND THE ALGEBRAIC PROPERTIES ARE STUDIED. A NEW
OPERATION IS INTRODUCED, WHICH SOLVES A CLASS OF
PWL-OPERATOR EQUATIONS THAT CANNOT BE SOLVED IN
TERMS OF THE BASIC ALGEBRAIC OPERATIONS. PWL-
OPERATOR METHODS ARE APPLIED TO DETERMINE INPUT AND
TRANSFER CHARACTERISTICS OF RESISTIVE PWL NETWORKS,
AND THE ANALYSIS OF PWL TWO-PORTS IS CONSIDERED.
PWL-OPERATOR METHODS ARE USED TO ANALYZE VACUUM-
TUBE AND TRANSISTOR CIRCUITS. EXTENSION OF PWL-
OPERATOR METHODS TO PWL NETWORKS THAT CONTAIN
REACTIVE ELEMENTS IS CONSIDERED. COMPUTER PROGRAMS
FOR THE ANALYSIS OF PWL NETWORKS ARE DISCUSSED.
(AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-282 032
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH
INST
FURTHER CONTRIBUTIONS TO THE REALIZATION OF BOOLEAN
POLYNOMIALS BASED ON INCIDENCE MATRICES AND ITS
PROGRAMMING ON THE IBM 650 COMPUTER, (U)
AUG 61 49P MORIWAKI, YOSHI I
REPT. NO. 938-61
CONTRACT: AF19 604 6620
PROJ: 5632
MONITOR: AFCRL 62 189

UNCLASSIFIED REPORT

DESCRIPTORS: *ALGEBRAS, *DIGITAL COMPUTERS,
*ELECTRICAL NETWORKS, *MATRIX ALGEBRA, PROGRAMMING
(COMPUTERS), TABLES (U)

THE MOST GENERAL PROCEDURE FOR FINDING MINIMUM CONTACT
SPRING NETWORKS IS DESCRIBED. THE PROGRAMMING OF THESE
PROCEDURES WITH THE AID OF AN IBM 650 COMPUTER IS
DISCUSSED.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-282 248

DAVID SARNOFF RESEARCH CENTER PRINCETON N J
THEORY OF ADJUSTABLE SWITCHING NETWORKS. 1: A.
THRESHOLD LOGIC. B. RELIABILITY OF SWITCHING NETWORKS (U)

APR 67 261P AMAREL, S. LEVY, S. I
WINDER, R. O. I
REPT. NO. 55-1
CONTRACT: AF 19(604)-8423
PROJ: 4641
MONITOR: AFCRL 62-318

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: THIS REPORT INCLUDES: THEORETICAL
CONSIDERATIONS ON RELIABILITY PROPERTIES OF RECURSIVE
TRIANGULAR SWITCHING NETWORKS, BY S. AMAREL AND J.
A. BRZOWSKI. 52P. INCL. ILLUS. 10 REFS. THE
RELIABILITY OF RECURSIVE TRIANGULAR SWITCHING NETWORKS BUILT
OF RECTIFIER GATES, BY SAUL LEVY. 54P. INCL. ILLUS. 3
REFS.

DESCRIPTORS: *SWITCHING CIRCUITS, COMPUTER LOGIC,
RELIABILITY, MATHEMATICAL ANALYSIS,
COMPUTERS (U)

A DISCUSSION IS PRESENTED OF A DOUBLY INFINITE
CHAIN OF PROPERTIES OF THRESHOLD FUNCTIONS, THE
SECOND LIMIT OF WHICH CHARACTERIZES SUCH FUNCTIONS.
THE FIRST TWO PROPERTIES, WHICH ARE THE MOST USEFUL
AS NECESSARY CONDITIONS, ARE GIVEN SPECIAL ATTENTION.
THEY YIELD INTERPRETATIONS IN ALGEBRAIC EXPRESSIONS
FOR THE FUNCTION AND PROVIDE A NATURAL ORDERING OF
THE FUNCTION'S ARGUMENTS. RELATIONS BETWEEN THE
FAMILIES OF PROPERTIES ARE GIVEN, AND THEIR
INDEPENDENCE SHOWN. SOME OTHER CONJECTURED
CHARACTERIZATIONS OF THRESHOLD FUNCTIONS ARE SHOWN
INVALID. THE NUMBER OF THRESHOLD FUNCTIONS, AS A
FUNCTION OF N, IS GIVEN A RELATIVELY GOOD UPPER
BOUND. (AUTHOR) (M)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZEO463

AD-282 27-

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
INVESTIGATION OF THRESHOLD SWITCHING TECHNIQUES FOR
DIGITAL COMPUTERS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 20 MAR 61-31 JAN 62.

JUN 62 274P

REPT. NO. 2-01-62-1

CONTRACT: AF33 616 8035

PROJ: 7062

MONITOR: ASD TDR62 308

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRICAL NETWORKS, *ELECTRONIC
SWITCHES, *LINEAR SYSTEMS, COMPLEX VARIABLES, DESIGN,
DIGITAL COMPUTERS, FUNCTIONS, MATHEMATICAL ANALYSIS,
SIGNAL-TO-NOISE RATIO (U)

MAJOR EMPHASIS IS PLACED ON THEORETICAL ASPECTS OF
THRESHOLD FUNCTIONS WITH PARTICULAR ATTENTION GIVEN
TO SYNTHESIS METHODS FOR SPECIFYING NETWORKS OF
THRESHOLD DEVICES. TECHNIQUES ARE PRESENTED FOR
DETERMINING LINEAR SEPARABILITY AND FOR CALCULATING
WEIGHTS AND THRESHOLD FOR THOSE FUNCTIONS WHICH ARE
LINEARLY SEPARABLE. ALGORITHMS FOR PARTITIONING
SWITCHING FUNCTIONS INTO SETS OF THRESHOLD FUNCTIONS
ARE DESCRIBED AS WELL AS TECHNIQUES FOR DECOMPOSING
NETWORKS OF UNCONSTRAINED THRESHOLD DEVICES INTO
NETWORKS OF DEVICES SATISFYING CERTAIN DESIGN
CONSTRAINTS. SPECIAL CONSIDERATION IS GIVEN THE
EFFECTS OF NOISE AND TOLERANCES IN SEVERAL TYPES OF
CIRCUITS SUITABLE FOR THRESHOLD DEVICES WITH THE
PRIMARY OBJECTIVE OF DETERMINING THE IMPORTANT DESIGN
CONSTRAINTS. LOGICAL DESIGN EXAMPLES ARE PRESENTED
TO DEMONSTRATE THE GENERAL UTILITY OF THRESHOLD
FUNCTIONS. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE0463

AD-286 179

REMINGTON RAND UNIVAC DI SPERRY RAND CORP PHILADELPHIA
PA

MATHEMATICAL CIRCUIT ANALYSIS AND DESIGN (U)
IV BROWN, ALBERT; MULLOCK, PHILIP J.

REPT. NO. 62 317

CONTRACT: AF19 604 5189

MONITOR: AFCRL 62 317

UNCLASSIFIED REPORT

DESCRIPTORS: •CIRCUITS, •DESIGN, •INTEGRATION,
•MATHEMATICAL ANALYSIS, •NUMERICAL METHODS AND
PROCEDURES, •STATISTICAL ANALYSIS, DIGITAL COMPUTERS,
PARTIAL DIFFERENTIAL EQUATIONS, PROGRAMMING
(COMPUTERS) (U)

A NUMBER OF NEW TECHNIQUES WERE INVESTIGATED FOR
THE MATHEMATICAL ANALYSIS AND DESIGN OF ELECTRONIC
CIRCUITS. THESE TECHNIQUES WERE TESTED ON SEVERAL
NEW DEVICES, AND VARIANTS OF THE INVERTER CIRCUIT
WERE EXAMINED IN MORE DETAIL. THE INVESTIGATIONS
DESCRIBED ARE DIVIDED INTO TWO PARTS, STATISTICAL AND
OTHER COMPUTATIONAL METHODS (PART II), AND
ANALYTICAL STUDIES (PART III). (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE04A3

AD-287 061

RAND CORP SANTA MONICA CALIF

THE SYNTHESIS OF CASCADE SWITCHING CIRCUITS

(U)

IV LEVINE, R.E.

UNCLASSIFIED REPORT

DESCRIPTORS: *DIGITAL COMPUTERS, *SWITCHING CIRCUITS,
AUTOMATION, CIRCUITS, FUNCTIONS, MATHEMATICAL
ANALYSIS, SIMULATION, SYNTHESIS

(U)

THE PROBLEM IS CONSIDERED OF SYNTHESIZING SWITCHING CIRCUITS THAT COMPUTE A GIVEN, COMPLETELY SPECIFIED SWITCHING FUNCTION, AND A NEW POINT OF VIEW IS ADOPTED IN WHICH SWITCHING CIRCUITS ARE CONSIDERED TO BE REALIZATIONS OF ALGORITHMS RATHER THAN INTERPRETATIONS OF TRUTH-FUNCTIONAL FORMULAE. A RESTRICTED CLASS OF ALGORITHMS, CALLED THE CASCADE ALGORITHMS, IS IDENTIFIED; IT IS SUGGESTED THAT TREE AND COLLAPSED-TREE, ITERATIVE, MULTIPLE-ITERATIVE SEQUENTIAL, AND CASCADED-SEQUENTIAL SWITCHING CIRCUITS MAY BE VIEWED AS REALIZATIONS OF CASCADE ALGORITHMS. ALL OF THESE CIRCUITS ARE CALLED, THEREFORE, CASCADE CIRCUITS. THREE BASIC TECHNIQUES--FUNCTIONAL DECOMPOSITION, MERGING, AND SKIPPING--WHICH PERMIT THE SYNTHESIS OF EFFICIENT CASCADE ALGORITHMS TO COMPUTE A GIVEN FUNCTION, ARE DESCRIBED. IT IS THEN SHOWN HOW THESE TECHNIQUES MAY BE APPLIED SO AS TO SYNTHESIZE A COLLAPSED TREE, ITERATIVE, MULTIPLE-ITERATIVE, SEQUENTIAL, OR CASCADED-SEQUENTIAL SWITCHING CIRCUIT THAT COMPUTES A GIVEN SWITCHING FUNCTION. EXAMPLES ARE DRAWN FROM THE TECHNOLOGY OF CURRENT-STEERING DEVICES, SUCH AS RELAYS AND CRYOTRONS, BUT THE METHOD IS APPLICABLE TO OTHER TECHNOLOGIES. THE PROCEDURES APPEAR TO BE WELL ADAPTED TO EXECUTION ON CONTEMPORARY DIGITAL COMPUTERS. (AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE0463

AD-293 860

AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASS

STUDIES IN THE THEORY OF SWITCHING CIRCUITS (U)
IV SMITH, EDWARD J.

UNCLASSIFIED REPORT

DESCRIPTORS: •SWITCHING CIRCUITS, DIGITAL COMPUTERS,
DIODES, ELECTRIC RELAYS, ELECTRICAL NETWORKS,
MATHEMATICAL ANALYSIS, MATRIX ALGEBRA, TABLES,
THEORY (U)

A SUMMARY OF A PROGRAM CONCERNED WITH VARIOUS
PROBLEMS IN THE THEORY OF SWITCHING CIRCUITS IS
GIVEN. SPECIFIC RESULTS INCLUDE: AN IMPROVED
AMBIT METHOD FOR REALIZING CUT-SET MATRICES, THE
DETECTION OF PARTIAL SYMMETRY IN BOOLEAN POLYNOMIALS,
REALIZATION OF SYMMETRIC DIODE CIRCUITS, TREATMENT OF
COMBINATIONAL RELAY-DIODE CIRCUITS BY MATRIX AND
GRAPH THEORETIC METHODS, AND AN IMPROVEMENT IN AN
ESTABLISHED TECHNIQUE FOR MINIMIZING THE INTERNAL
STATES IN AN INCOMPLETELY SPECIFIED SEQUENTIAL
MACHINE. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZEG463

AD-296 990

CASE INST OF TECH CLEVELAND OHIO

THE SYNTHESIS OF MINIMUM SENSITIVITY NETWORKS (U)

JAN 63

IV

SCHOEFFLER, JAMES D. IWAREN, A.D.I

REPT. NO. TR6

CONTRACT: NONR114110

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRICAL NETWORKS, COMPUTERS, DESIGN,
DIFFERENTIAL EQUATIONS, NETWORKS, SENSITIVITY,
SYNTHESIS (U)

THE SYNTHESIS OF NETWORKS WITH MINIMUM SENSITIVITY TO ELEMENT TOLERANCES IS STUDIED FROM A COMPUTER VIEWPOINT. THE THEORY OF EQUIVALENT NETWORKS IS USED TO GENERATE A SEQUENCE OF NETWORKS WHOSE TRANSFER FUNCTIONS ARE IDENTICAL TO THAT OF A GIVEN NETWORK BUT WHOSE ELEMENTS DIFFER FROM ONE NETWORK TO THE NEXT BY AN INCREMENTAL AMOUNT. IN THE LIMIT, DIFFERENTIAL EQUATIONS RESULT WHOSE SOLUTION AT ANY VALUE OF THE INDEPENDENT VARIABLE GIVE THE ELEMENTS OF AN EQUIVALENT NETWORK. SIMILARLY, DIFFERENTIAL EQUATIONS FOR THE SENSITIVITY OF THE TRANSFER FUNCTION TO CHANGES IN EACH OF THE ELEMENTS ARE DERIVED. THE DIFFERENTIAL EQUATIONS IN BOTH CASES ARE LINEAR HOMOGENEOUS WITH THE ELEMENTS OF THE TRANSFORMATION MATRIX AS THE FORCING FUNCTIONS. WITH THE AID OF THE EXPONENTIAL SOLUTION TO THE MATRIX DIFFERENTIAL EQUATION, DIGITAL COMPUTER SOLUTION EVEN FOR COMPLEX NETWORKS IS VERY STRAIGHTFORWARD AND RAPID. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-418 163

ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
AN ALGORITHM FOR THE SYNTHESIS OF LARGE SE QUENTIAL
SWITCHING CIRCUITS, (U)

MAY 63 49P ELSEY, JOHN :

REPT. NO. R169

CONTRACT: DA36 039AMC02208

PROJ: DA PROJ. 3A99 25 004

UNCLASSIFIED REPORT

DESCRIPTORS: (*SWITCHING CIRCUITS, SYNTHESIS),
(*NUMERICAL METHODS AND PROCEDURES, SYNTHESIS),
DIGITAL COMPUTER, PROGRAMMING (COMPUTERS),
FUNCTIONS, COMPUTER STORAGE DEVICES, MATHE
MATICAL MODELS, FEEDBACK, SEQUENCE SWITCHES,
CONTROL SEQUENCES, CODING, SYNCHRONIZATION,
MATRIX ALGEBRA, EQUATIONS, COMPUTER LOGIC,
COMBINATORIAL ANALYSIS, TABLES. (U)
IDENTIFIERS: ALGORITHM, 1963. (U)

WITH THE DEVELOPMENT AND WIDESPREAD USE OF LARGE
DIGITAL COMPUTERS, WHICH ARE SWITCHING CIRCUITS,
THERE HAS BEEN AN INCREASING INTEREST IN SWITCH ING
CIRCUIT THEORY. MUCH EFFORT HAS BEEN SPENT IN
DESIGNING OR SYNTHESIZING SWITCHING CIRCUITS, BUT
UNFORTUNATELY MANY OF THE PROCEDURES NOW IN USE ARE
MORE OF AN ART THAN A SCIENCE IN THAT MUCH INSIGHT
AND EXPERIENCE ARE USUALLY REQUIRED ON THE PART OF
THE DESIGNER. SOME SYSTEMATIC DE SIGN METHODS HAVE
BEEN INTRODUCED BUT THESE ARE ONLY APPLICABLE TO
RATHER SMALL CIRCUITS. THIS THESIS DEVELOPS AND
PRESENTS AN ALGORITHM FOR SYNTHESIZING ASYNCHRONOUS
SEQUENTIAL SWITCHING CIRCUITS. THE ALGORITHM HAS
CERTAIN PROPERTIES WHICH MAKE IT USEFUL AND
APPLICABLE TO LARGE SWITCHING CIRCUITS SUCH AS THE
CONTROL UNIT OF A DIGITAL COMPUTER. THE STEPS IN
THE ALGORITHM ARE SYSTEMATIC AND SIMPLE PERMITTING A
SOLUTION TO BE OBTAINED IN A RELATIVELY SHORT AMOUNT
OF TIME. THE RESULTING DESIGN IS NOT OPTIMUM IN
THAT THE CIRCUIT HAS THE MINIMUM NUMBER OF STATES OR
MINIMUM AMOUNT OF LOGIC. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZEO463

AD-429 351

RAND CORP SANTA MONICA CALIF

CHALLENGES OF MODERN CONTROL THEORY, (U)

JAN 64 7P BELLMAN, RICHARD I

REPT. NO. RM3956PR

CONTRACT: AF49 638 700

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CONTROL SYSTEMS, MATHEMATICAL MODELS),
THEORY, NUMERICAL ANALYSIS, BIOLOGY, MEDICINE,
COMPUTERS, TEACHING MACHINES, ALGEBRA, ALGEBRAIC
TOPOLOGY, CYBERNETICS, NERVOUS SYSTEM, BRAIN,
PROSTHETICS, DEAFNESS, BLINDNESS, CANCER, HEART,
MENTAL DISORDERS (U)

IDENTIFIERS: 1964, DYNAMIC PROGRAMMING, CONTROL
THEORY, EMBEDDING (U)

THE FUNDAMENTAL OBJECTIVE OF THE NEW SCIENTIFIC
DISCIPLINE CALLED 'CONTROL THEORY' IS THAT OF
MODIFYING THE BEHAVIOR OF A SYSTEM SUBJECT TO
VARIOUS CONSTRAINTS OF FEASIBILITY SO AS TO ACHIEVE
DESIRED AIMS. FROM THE MATHEMATICAL POINT OF
VIEW, THE PRIME PURPOSE IS TO APPROXIMATE TO REALITY
BY MEANS OF HIERARCHIES OF MATHEMATICAL MODELS, EACH
REPRESENTING A PROJECTION OF THE SCIENTIFIC SCENE.
SOME ASPECTS OF THIS ATTITUDE ARE DISCUSSED AND THE
POSSIBLE CONTRIBUTIONS OF MODERN CONTROL THEORY TO
THE BIOMEDICAL DOMAIN ARE BRIEFLY INDICATED.

(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE0463

AD-430 819

PARKE MATHEMATICAL LABS INC CARLISLE MASS
A MATHEMATICAL MODEL FOR INPUT-OUTPUT DEVICES AND
THEIR CONNECTIONS,

(U)

NOV 63 62P CALABE, L. RILEY, J. A. ;

REPT. NO. SR5

CONTRACT: AF19 628 2417

PROJ: 4608

TASK: 460805

MONITOR: AFRL 64 4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INPUT-OUTPUT DEVICES, MATHEMATICAL
MODELS), (*COMPUTER LOGIC, THEORY), COMPUTER STORAGE
DEVICES, COMPUTERS, SWITCHING CIRCUITS, CONTROL
SYSTEMS, SEQUENCES, ALGEBRAS, FUNCTIONS, OPERATORS
(MATHEMATICS), MATHEMATICAL LOGIC, GROUPS
(MATHEMATICS), PULSE ANALYZERS, CIRCUITS

(U)

IDENTIFIERS: 1963, ABSTRACT ALGEBRA, BANG-BANG
CONTROL

(U)

CONTENTS: INTUITIVE DISCUSSION - SWITCHES,
SERIES AND PARALLEL CONNECTIONS; CONTROL
CONNECTION, INPUT CONTRACTION, EVALUATION;
MULTIPLE-OUTPUT DEVICES; FORMAL THEORY -
OPERATIONS ON SEQUENCES; THE SUBSTITUTION
ALGEBRA OF FUNCTIONS; SUBSTITUTION ALGEBRAS
OF DEVICES; AND SUBALGEBRAS; HOMOMORPHISMS;
COMPLETENESS.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-601 197

ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
APPLICATION OF LINEAR GRAPHS TO ELECTRICAL NETWORKS,
SWITCHING NETWORKS AND COMMUNICATION NETS. (U)

APR 64 150P MAYEDA, W. I

REPT. NO. R203

CONTRACT: DA36 D39AMC02208E

PROJ: 3A99 25 004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*NETWORKS, GRAPHICS), (*TOPOLOGY,
LINEAR SYSTEMS), ELECTRICAL NETWORKS, SWITCHING
CIRCUITS, COMMUNICATION SYSTEMS, MATRIX ALGEBRA,
DIGITAL COMPUTERS, PROGRAMING (COMPUTERS) (U)

THIS PAPER IS DIVIDED INTO THREE PARTS: THE
FIRST PART SHOWS HOW LINEAR GRAPHS ARE USED IN
ANALYSIS OF ELECTRICAL NETWORKS. THE PROOF FOR THE
TOPOLOGICAL FORMULAS OF TRANSFER FUNCTIONS OF PASSIVE
NETWORKS WITHOUT MUTUAL COUPLINGS GIVEN HERE IS THE
FIRST FORMAL AND PRECISE PROOF IN THIS FIELD. BY
THE USE OF TOPOLOGICAL FORMULAS, SUCH A PASSIVE
NETWORK CAN BE ANALYZED BY A DIGITAL COMPUTER. THE
SECOND PART DISCUSSES THE APPLICATION OF LINEAR
GRAPHS TO SWITCHING NETWORKS BY STARTING WITH
EXPLORATION OF THE PROPERTIES OF PATHS IN A LINEAR
GRAPH. THEN THE NECESSITY OF REALIZING A CUT SET
MATRIX (OR CIRCUIT MATRIX) IS DISCUSSED. THE
THIRD PART DISCUSSES A RATHER NEW FIELD WHICH IS
MANY-PORTS FLOW PROBLEMS WHICH IS CALLED THE THEORY
OF COMMUNICATION NETS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: ZE0463

AD-604 046

RENSSELAER POLYTECHNIC INST TROY N Y
PHYSICAL PHENOMENA FOR LOGICAL FUNCTIONS.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,

FEB 64 76P BEAM, WALTER R. I

CONTRACT: AF AFOSR62 194

MONITOR: AFOSR , 64 1379

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTER LOGIC, SEMICONDUCTOR
DEVICES), (*SEMICONDUCTOR DEVICES, COMPUTER LOGIC),
DIGITAL COMPUTERS, NEURISTORS, THIN FILMS (STORAGE
DEVICES), NIOBIUM ALLOYS, OXIDES, COMPUTER STORAGE
DEVICES, TOPOLOGY, POWER SUPPLIES, RELIABILITY
(ELECTRONICS), FEASIBILITY STUDIES

(U)

IDENTIFIERS: THIN FILMS, THIN FILMS
ELECTRONICS

(M)

THERE ARE A NUMBER OF PHYSICAL PHENOMENA OCCURRING
IN SOLIDS WHICH HAVE SOME PROMISE FOR APPLICATION TO
LOGICAL DEVICES. SOME OF THESE HAVE BEEN PARTIALLY
EXPLORED AND AT LEAST FOR THE PRESENT, DISCARDED.
OTHERS HAVE RECEIVED NO CONSIDERATION, NOT EVEN A
FEASIBILITY EVALUATION. THE PURPOSE OF THIS WORK
IS TO CONSIDER SOME OF THESE PHENOMENA TO DISCOVER IN
WHAT FORM AND HOW WELL THEY MIGHT BE USED TO
CONSTRUCT DEVICES AND IMPLEMENT USEFUL LOGICAL
FUNCTIONS. TECHNICAL STUDY AREAS INCLUDE:
DISTRIBUTED CONSTANT NEURISTORS, NIOBIUM OXIDE
NEGATIVE RESISTANCE ELEMENTS, MINIMUM COMPLEXITY
DIGITAL ELECTRONICS, CONTINUOUS-MEDIUM DOMAIN LOGIC
AND MEMORY DEVICES, AND SOME REMARKS ON TOPOLOGY AND
POWER SUPPLY OF LOGICAL NETWORKS.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-607 228

PRINCETON UNIV N J DIGITAL SYSTEMS LAB

IMPLICATION TECHNIQUES FOR BOOLEAN FUNCTIONS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.

AUG 64 9P GAINES, R. S. :

REPT. NO. PU-DSL-39

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPPORTED IN PART BY THE BELL
TELEPHONE LABS., MURRAY HILL, N. J. PREPARED FOR
PRESENTATION AT THE ANNUAL SYMPOSIUM (5TH) ON
SWITCHING CIRCUIT THEORY AND LOGICAL DESIGN,
PRINCETON, N. J., NOV 11-12, 13, 1964.

DESCRIPTORS: (•SPECIAL FUNCTIONS (MATHEMATICAL),
COMPUTER LOGIC), (•COMPUTER LOGIC, SPECIAL FUNCTIONS,
MATHEMATICAL)), SWITCHING CIRCUITS, MATHEMATICAL
LOGIC, NUMERICAL ANALYSIS, PRIME NUMBERS, MATRIX
ALGEBRA, CIRCUITS, COMPUTERS

(U)

IDENTIFIERS: PRIME IMPLICANTS

(U)

THIS PAPER PRESENTED SEVERAL USES OF THE LOGICAL
CONNECTIVE OF IMPLICATION TO PROBLEMS OF INTEREST IN
SWITCHING THEORY. THE IMPLICATIONS WHICH HOLD
AMONG THE PRIME IMPLICANTS OF A FUNCTION WERE
EXAMINED. A NEW SET OF NECESSARY AND SUFFICIENT
CONDITIONS FOR DETERMINING ESSENTIAL PRIME IMPLICANTS
AND A RAPID APPROXIMATE METHOD FOR OBTAINING MINIMAL
SUMS WERE INCLUDED. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZEP463

AD-607 476

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ANALYSIS OF LINEAR SEQUENTIAL CIRCUITS BY CONFLUENCE
SETS. (U)

JUN 64 15P GILL, ARTHUR I
REPT. NO. ERL-64-30
CONTRACT: NONR222 53

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPRINTED FROM IEEE TRANSACTIONS ON
ELECTRONIC COMPUTERS, VOLUME EC-13:226-231, NO.3,
JUN 64.

DESCRIPTORS: (*CIRCUITS, SEQUENCES), (*SET THEORY,
CIRCUITS), LINEAR SYSTEMS, ANALYSIS, SWITCHING
CIRCUITS, GROUPS (MATHEMATICS), TOPOLOGY, GRAPHICS,
COMPUTERS, NETWORKS, TRANSIENTS (U)

IN THIS PAPER THE GROUP-THEORETICAL CONCEPT OF
'CONFLUENCE SETS' IS INTRODUCED AS A VALUABLE
TOOL IN THE ANALYSIS OF LINEAR SEQUENTIAL CIRCUITS
(LSC'S). USING THIS CONCEPT, A SCHEME IS
FORMULATED FOR PRODUCING STATE GRAPH OF AUTONOMOUS
LSC'S WHICH, IN THE 'SINGULAR' CASE, IS
SUPERIOR TO CURRENTLY KNOWN SCHEMES. SINGULAR
LSC'S, WHICH ARE OF POTENTIAL INTEREST IN ERROR
CORRECTION SYSTEMS, ARE STUDIED IN DETAIL.
PROPERTIES OF THEIR STATE GRAPHS ARE DERIVED,
CULMINATING IN A UNIQUE CHARACTERIZATION OF SUCH
GRAPHS IN TERMS OF REPRESENTATIVE 'CYCLES' AND
'TREES'. TOGETHER WITH KNOWN RESULTS ON
NONSINGULAR CIRCUITS, THE RESULTS IN THIS PAPER OFFER
A DESCRIPTION OF THE AUTONOMOUS BEHAVIOR OF THE
GENERAL LINEAR SEQUENTIAL CIRCUIT. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-608 881

MASSACHUSETTS INST OF TECH CAMBRIDGE ELECTRONIC SYSTEMS
LAB

SYNTHESIS OF SEQUENTIAL SWITCHING NETWORKS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

OCT 64 174P SUSSKIND, A. K. THARING, D. R. I

LIU, C. L. MENGES, K. S. I

REPT. NO. ESL-FR-216

CONTRACT: AF33 657 11677

PROJ: DSR9800 ,5581

TASK: 7062

MONITOR: RADG , TDR64 492

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SWITCHING CIRCUITS, SYNTHESIS),
(*NETWORKS, COMPUTER LOGIC), INPUT-OUTPUT DEVICES,
SEQUENCE SWITCHES, ITERATIVE METHODS, CIRCUITS,
COMPUTERS, COMPUTER STORAGE DEVICES, THEOREMS,
COMBINATORIAL ANALYSIS, PERMUTATIONS, ALGEBRA (U)

THIS REPORT PRESENTS RESULTS OF STUDIES IN THE
SYNTHESIS OF SEQUENTIAL SWITCHING NETWORKS. TOPICS
COVERED ARE THE SYNTHESIS OF PERMUTATION MACHINES
WITH THRESHOLD ELEMENTS, IN PARTICULAR ONE THRESHOLD
ELEMENT PER MEMORY ELEMENT; A METHOD OF SYNTHESIS IN
WHICH THE COMBINATIONAL LOGIC OF ANY SEQUENTIAL
CIRCUIT MAY BE REALIZED BY MEANS OF A CASCADED
ARRANGEMENT OF S-INPUT, S-OUTPUT LOGIC BLOCKS
(S DENOTES NUMBER OF STATE VARIABLES). THAT
APPROACH HAS APPLICABILITY IN INTEGRATED CIRCUIT
REALIZATION OF COMPUTERS. OTHER TOPICS ARE IN THE
SYNTHESIS OF SEQUENTIAL SWITCHING CIRCUITS IN SHIFT-
REGISTER FORM. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE0463

AD-610 149

ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
GENERATION OF DIRECTED TREES, 2-TREES AND PATHS
WITHOUT DUPLICATION, (U)

JAN 65 49P PAUL, ARCHIE JOSEPH, JR. I

REPT. NO. CSL-R-241

CONTRACT: DA28 043AMC00073E

MONITOR: AFOSR 65-0259

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TOPOLOGY, NETWORKS), (*NETWORKS,
TOPOLOGY), SWITCHING CIRCUITS, ELECTRICAL NETWORKS,
DIGITAL COMPUTERS, CIRCUITS, COMMUNICATION SYSTEMS,
SET THEORY, GRAPHICS (U)

THE INCREASING NUMBER OF APPLICATIONS OF GRAPH
THEORY TO THE SOLUTION OF PROBLEMS IN MANY FIELDS
MAKE IT DESIRABLE TO HAVE AVAILABLE COMPLETE
KNOWLEDGE OF THE PROPERTIES OF THESE GRAPHS. SINCE
MANY PROBLEMS IN ELECTRICAL NETWORKS, SWITCHING
CIRCUITS, AND COMMUNICATION NETS CAN BE FORMULATED IN
TERMS OF DIRECTED GRAPHS, IT IS APPROPRIATE TO STUDY
THEIR PROPERTIES. IN THIS PAPER, PROCEDURES ARE
DEVELOPED FOR GENERATING THE DIRECTED TREES, 2-TREES
AND PA IS OF A DIRECTED GRAPH. UNLIKE OTHER
METHODS FOR GENERATING THESE SUBGRAPHS, THE
PROCEDURES DEVELOPED HERE AVOID GENERATING DUPLICATE
ELEMENTS THUS THEY ELIMINATE THE NECESSITY OF
REPEATED SEARCH TO SELECT A COMPLETE SET OF ELEMENTS.
PROOFS ARE GIVEN TO VERIFY THAT ALL ELEMENTS OF THE
SET OF DIRECTED TREES, 2-TREES OR PATHS ARE GENERATED
AND THAT NO DUPLICATE ELEMENTS OCCUR. EXAMPLES ARE
GIVEN TO ILLUSTRATE THE PROCEDURES IN DETAIL. THE
PROCEDURES ARE AMENABLE TO DIGITAL COMPUTER
APPLICATION. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZEO463

AD-610 771

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF
ENGINEERING

OPTIMIZING THE ASSIGNMENT PROBLEM IN THE SYNTHESIS OF
SEQUENTIAL MACHINES. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,

AUG 64 103P HALSEY, JESSE W. I

REPT. NO. GRE/MATH/64 15

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LINEAR PROGRAMMING, OPTIMIZATION),
(*OPERATIONS RESEARCH, SWITCHING CIRCUITS),
(*SWITCHING CIRCUITS, SYNTHESIS), COMPUTER LOGIC,
NETWORKS, INPUT/OUTPUT DEVICES, COMBINATORIAL ANALYSIS,
ALGEBRA, CODING, DIGITAL COMPUTERS (U)
IDENTIFIERS: ASSIGNMENT PROBLEM, SEQUENTIAL MACHINES,
BINARY CODING (U)

A PROCEDURE FOR ASSIGNING BINARY CODES TO THE
INPUTS OF A SEQUENTIAL MACHINE IS EXAMINED IN AN
ATTEMPT TO MECHANIZE THE PROCEDURE USING LINEAR
PROGRAMMING. REASONS ARE GIVEN FOR THE DIFFICULTY
INVOLVED IN ATTEMPTING TO DERIVE LINEAR CONSTRAINING
EQUATIONS FOR AN OBJECTIVE FUNCTION SPECIFIED BY THE
PROCEDURE. IN THE SECOND PART OF THIS THESIS, THE
PARTITION-PAIR ON THE SET OF STATES OF A SEQUENTIAL
MACHINE IS EXTENDED TO THE INPUTS OF A SEQUENTIAL
MACHINE IN AN EFFORT TO SIMPLIFY THE LOGICAL
EQUATIONS. IT IS SHOWN THAT INPUT-STATE PAIRS ARE
EFFECTIVE IN OBTAINING THE SIMPLIFICATION OF THESE
LOGICAL EQUATIONS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-612 642

POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH
INST

SINGULAR LINEAR SEQUENTIAL MACHINES: SOME FURTHER
GROUP PROPERTIES AND CANONICAL FORM REALIZATIONS, (U)

OCT 64 20P LAVALLEE, PIERRE ;

REPT. NO. PIBMRI-1250-64

CONTRACT: AF49 638 1402

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (CIRCUITS, SEQUENCES), (SET THEORY,
CIRCUITS), LINEAR SYSTEMS, ANALYSIS, SWITCHING
CIRCUITS, GROUPS (MATHEMATICS), TOPOLOGY, GRAPHICS,
COMPUTERS, NETWORKS, TRANSIENTS (U)
IDENTIFIERS: SHIFT REGISTERS (U)

SINGULAR AUTONOMOUS LINEAR SEQUENTIAL MACHINES ARE
ANALYZED FOLLOWING SIMPLE GROUP PROPERTIES INTRODUCED
BY GILL (IEEE TRANSACTIONS ON ELECTRONIC
COMPUTERS, VOL. EC-13: 226-231, NO. 3, JUN
1964, AD-607 476). IT IS SHOWN THAT THE SET OF
JUNCTION STATES FOR THE CONFLUENCE SETS FORM A GROUP,
WITH AS NORMAL SUBGROUP, THE SETS OF STATES ON THE
CYCLE SETS. THE SET OF STATES MAPPING INTO THE
NULL (0) STATE ALSO FORMS A GROUP CALLED THE NULL
TREE GROUP. THE CYCLE SET GROUP AND THE NULL TREE
GROUP ARE REALIZED SEPARATELY AND THE DIRECT SUM OF
THESE TWO GROUPS COMPLETELY CHARACTERIZES THE
OPERATION OF THE MACHINE. THE NULL TREE IS SHOWN
TO BE CHARACTERIZED BY A SET OF M DISJOINT PATHS:
TO EACH OF THESE PATHS THERE CORRESPONDS A SHIFT
REGISTER HAVING AS MANY DELAY ELEMENTS AS THERE ARE
STATES IN THAT PATH. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-619 806

AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASS

STATE-LOGIC RELATIONS IN AN ITERATIVE STRUCTURE FOR
AUTONOMOUS SEQUENTIAL MACHINE. (U)

DESCRIPTIVE NOTE: PHYSICAL AND MATHEMATICAL SCIENCES
RESEARCH PAPERS,

JUN 65 24P KING, WILLIAM F. , III. I

REPT. NO. AFCRL-65-439 , PMSRP-112

PROJ: 4641

TASK: 464104

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTER LOGIC, SWITCHING
CIRCUITS), (*ITERATIVE METHODS, COMPUTERS),
MICROMINIATURIZATION(ELECTRONICS), AUTOMATA,
SYNTHESIS, NETWORKS (U)

IDENTIFIERS: SEQUENTIAL MACHINES (U)

THE STATE-LOGIC RELATIONS ARE DETERMINED IN AN
ITERATIVE STRUCTURE FOR ANY AUTONOMOUS SEQUENTIAL
MACHINE. A MODEL (UNLIKE THAT OF MEALY) IS
USED IN WHICH DELAY IS DISTRIBUTED THROUGHOUT THE
MACHINE. THEOREMS ARE PRESENTED WHICH PRESCRIBE
THE INTERCONNECTION OF IDENTICAL ELEMENTS TO REALIZE
ANY AUTONOMOUS SEQUENTIAL BEHAVIOR. SYNTHESIS, AS
DESCRIBED HERE, YIELDS A MORE COSTLY MACHINE IN TERMS
OF DELAY ELEMENTS THAN THOSE OF PREVIOUS WORKERS.
IN ADDITION TO THE ITERATIVE STRUCTURE, INCREASED
SPEED OF OPERATION IS THE ADVANTAGE BOUGHT BY THE
EXTRA DELAY ELEMENTS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-625 201 9/1 12/1
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
ELEMENTARY COMPLETE TREE TRANSFORMATION, (U)
DEC 65 24P MAYEDA, WATARU ;
REPT. NO. R-272
CONTRACT: DA-28-043-AMC-00073 GRANT , AF-AFOSR-931-
65
PROJ: DA-20014501831F
MONITOR: AFOSR 66-0496

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*NL WORKS, TOPOLOGY), (*TOPOLOGY,
NETWORKS), (*TRANSFORMATIONS(MATHEMATICS),
TOPOLOGY), COMMUNICATION SYSTEMS, ELECTRICAL
NETWORKS, SET THEORY, DIGITAL COMPUTERS,
GRAPHICS (U)

IT IS KNOWN THAT A PASSIVE ELECTRICAL NETWORK
WITHOUT MUTUAL COUPLINGS CAN BE ANALYZED BY KNOWING
ALL POSSIBLE TREES OF A LINEAR GRAPH CORRESPONDING TO
THE NETWORK. SINCE THERE EXISTS A REASONABLY
SIMPLE METHOD OF GENERATING ALL POSSIBLE TREES OF A
LINEAR GRAPH WITHOUT DUPLICATIONS, ANALYSIS OF SUCH A
NETWORK BY A COMPUTER BECOMES SIMPLE. WHEN A PAIR
OF LINEAR GRAPHS IS USED, AN ACTIVE NETWORK CAN BE
ANALYZED BY KNOWING ALL POSSIBLE COMPLETE TREES EACH
OF WHICH IS A TREE OF BOTH LINEAR GRAPHS. AT
PRESENT THERE IS NO SIMPLE METHOD OF GENERATING ALL
POSSIBLE COMPLETE TREES WITHOUT DUPLICATIONS.
HENCE, IN ORDER TO OBTAIN ALL POSSIBLE COMPLETE
TREES BY A COMPUTER, ONE OF THE BEST AVAILABLE
METHODS AT PRESENT IS TO GENERATE ALL POSSIBLE TREES
OF EACH LINEAR GRAPH TO OBTAIN TWO COLLECTIONS OF
TREES, THEN INTERSECTING THE TWO COLLECTIONS. IT
IS NOT DIFFICULT TO DESIGN AN ACTIVE NETWORK SUCH
THAT THERE ARE MORE THAN A THOUSAND OF TREES IN EACH
OF A PAIR OF LINEAR GRAPHS CORRESPONDING TO THE NET,
BUT THERE ARE LESS THAN ONE HUNDRED COMPLETE TREES.
HENCE TO OBTAIN A SIMPLE METHOD OF GENERATING ALL
POSSIBLE COMPLETE TREES IS UNDOUBTEDLY IMPORTANT FOR
ANALYSIS OF ACTIVE NETWORKS BY A COMPUTER. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-631 657 9/2 9/5
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
COMPUTER-AIDED ANALYSIS OF A SILICON MONOLITHIC
INTEGRATED CURRENT SWITCH GATE. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 66 28P BELL, WILLIAM V. I
KERNAN, JOSEPH E. , JR. IHOLOB, PAUL H. I
REPT. NO. ECOM-2683,
PROJ: DA-1LO-13901-A91A,
TASK: 1LO-13901-A91A-0035,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SWITCHING CIRCUITS, *COMPUTER
LOGIC), (*INTEGRATED CIRCUITS, COMPUTER LOGIC),
(*GATES(CIRCUITS), INTEGRATED CIRCUITS),
SILICON, CIRCUITS, ELECTRICAL PROPERTIES,
SYNTHESIS, PROGRAMMING(COMPUTERS), DIGITAL
COMPUTERS, NOISE, REDUCTION (U)

IN THE D.C. DESIGN OF LARGE SIGNAL NON-SATURATING-
TYPE LOGIC CIRCUITS, IT HAS BEEN POSSIBLE TO DEVELOP
A SET OF WORST CASE DEFINING EQUATIONS WHICH TAKE
INTO ACCOUNT ALL EXTERNAL AND INTERNAL PARAMETER
VARIATIONS; SUCH AS RESISTOR, VOLTAGE TOLERANCES AND
CERTAIN TRANSISTOR PARAMETERS. AN EXAMPLE OF HOW A
COMPUTER SOLVES THE PROBLEM OF SPECIFYING ALLOWABLE
NOISE IMMUNITY OF A CURRENT SWITCH GATE (C.S.G.)
UNDER WORST CASE STATIC CONDITIONS IS ILLUSTRATED IN
THIS REPORT. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-640 457 9/5 9/2
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
MATRIX SWITCHES AND ERROR CORRECTING CODES FROM BLOCK
DESIGNS, (U)
AUG 66 48P BAHL, LALIT RAJ ;
REPT. NO. R-314,
CONTRACT: DA-28-043-AMC-00073(E), NSF-GK-690
PROJ: DA-20014501831F,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTES:

DESCRIPTORS: (*SWITCHING CIRCUITS, *MAGNETIC CORE
STORAGE), ERRORS, COMPUTERS, CODING, DESIGN,
MATRIX ALGEBRA, CORRECTIONS, COMBINATORIAL
ANALYSIS (U)

METHODS OF OBTAINING MATRIX SWITCHES FROM BLOCK
DESIGNS WERE FORMULATED BY SINGLETON AND NEUMANN.
THE FIRST PART OF THE REPORT EXTENDS SINGLETON'S
METHOD FOR DESIGNING UNIPOLAR SWITCHES TO THE DESIGN
OF BIPOLAR SWITCHES. A NEW CLASS OF LOW NOISE
SWITCHES IS OBTAINED BY PERMUTATION OF THE WINDING
MATRIX OF NOISELESS SWITCHES AND IT IS SHOWN HOW
THESE NEW SWITCHES ARE RELATED TO BLOCK DESIGNS.
THE LATTER PART OF THE REPORT IS CONCERNED WITH
METHODS OF OBTAINING ERROR DETECTING AND ERROR
CORRECTING CODES FROM BLOCK DESIGNS. SOME OF THESE
CODES ARE FOUND TO BE OPTIMAL. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-643 158 9/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASS
CATEGORIZATIONS AND REALIZATIONS OF POSITIVE REAL AND
BIQUADRATIC IMMITTANCE FUNCTIONS. PART II:
PROGRAMMED REALIZATIONS. (U)
DESCRIPTIVE NOTE: PHYSICAL AND MATHEMATICAL SCIENCES
RESEARCH PAPERS,
AUG 66 178P HAASE, KURT H. I
REPT. NO. AFCRL-PMSRP-215-PT-2 , AFCRL-66-243-PT-
2
PROJ: AF-5628
TASK: 562806

UNCLASSIFIED REPORT

DESCRIPTORS: (ELECTRICAL NETWORKS, SYNTHESIS),
ADMITTANCE, ELECTRICAL IMPEDANCE, NUMERICAL
ANALYSIS, GRAPHICS, FUNCTIONS, COMPUTERS,
CIRCUITS (U)

CATEGORIZATIONS AND REALIZATIONS ARE APPLIED TO
POSITIVE REAL AND BIQUADRATIC IMMITTANCE FUNCTIONS IN
NINE NUMERICAL EXAMPLES. COMPUTATION PLANS AND
ROUTINE COMPUTATION PROCEDURES ARE DEVELOPED
PREDOMINANTLY FOR THE USE OF DESK CALCULATING
MACHINES. THIS PORTION PRESENTS THE APPLICATION OF
A THEORY THAT HAS BEEN DISCUSSED IN AD-634 764,
'CATEGORIZATIONS AND REALIZATIONS OF POSITIVE
REAL AND BIQUADRATIC IMMITTANCE FUNCTIONS.'
THE EXAMPLES MEET ANY POSSIBLE OCCURRENCE OF
POSITIVE REAL AND BIQUADRATIC IMPEDANCE OF THE
ADMITTANCE FUNCTION. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-656 872 9/5 9/2
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)
LINEAR CIRCUIT ANALYSIS BY MEANS OF A DIGITAL
COMPUTER. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JAN 67 29P CRADWICK, C. C. I
REPT. NO. RAE-TR-47012

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRICAL NETWORKS, MATHEMATICAL
ANALYSIS), (*COMPUTER PROGRAMS, ELECTRICAL
NETWORKS), LINEAR SYSTEMS, DIGITAL COMPUTERS,
DESIGN, MATRIX ALGEBRA, COSTS (U)

ONLY QUITE SIMPLE ELECTRONIC CIRCUITS CAN NORMALLY
BE ANALYSED EXACTLY BY MANUAL MEANS, DUE TO THE LABOR
INVOLVED IN SOLVING THE CIRCUIT EQUATIONS. THIS
REPORT IS AN INTRODUCTION TO THE USE OF A DIGITAL
COMPUTER TO OVERCOME THIS PROBLEM. A GENERAL
PURPOSE PROGRAMME IS DESCRIBED WHICH WILL ANALYSE
LINEAR CIRCUITS, CONTAINING BOTH PASSIVE AND ACTIVE
ELEMENTS, OF UP TO 50 NODES, AND THE UNDERLYING
CIRCUIT ANALYSIS IS DISCUSSED IN SOME DETAIL.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-658 980 12/2
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
APPLICATION OF BOOLEAN ALGEBRA TO ANALYSIS AND
SIMULATION OF NETWORKS. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 67 18P DUNN, ROBERT M. ;
REPT. NO. ECOM-2856
PROJ: DA-1E6-20105-A485
TASK: 1E6-20105-A485-99-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*OPERATIONS RESEARCH, *NETWORKS),
(*ALGEBRAS, OPERATIONS RESEARCH),
OPTIMIZATION, SIMULATION, ALGORITHMS,
CLASSIFICATION, ANALYSIS, TRANSPORTATION,
COMMUNICATION SYSTEMS, INFORMATION RETRIEVAL (U)

AN APPLICATION OF REVISED TECHNIQUES OF BOOLEAN
MATRIX ALGEBRA IS MADE TO NETWORK ANALYSIS AND
SIMULATION. TWO CLASSES OF NETWORKS ARE DISCUSSED
-- TRANSPORTATION/COMMUNICATION AND CLASSIFICATION/
INFORMATION RETRIEVAL. THE ADVANTAGE OF THE
TECHNIQUE IS HIGH-SPEED COMPUTATION FOR RELATIVELY
LARGE NETWORKS, E.G., > 1,000 ELEMENTS.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE0463

AD-659 314 9/5 9/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ASSIGNMENT AND PROGRAM CONTROL OF BOUNDARY CONDITIONS
DURING SOLUTION OF NONSTATIONARY BOUNDARY VALUE
PROBLEMS OF NETWORK SIMULATORS, (U)
AUG 67 17P MUROMSKII, A. V. ;
REPT. NO. FTD-MT-67-34
MONITOR: TT 67-62997

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ZADANIE I PROGRAMMNOE UPRAVLENIE
GRANICHNYMI USLOVIYAMI PRI RESHENII NESTATSIONARNYKH
KRAEVYKH ZADACH NA SETOCHNYKH MODEL'YAKH, EDITED
MACHINE TRANS. OF MONO. ANALOGOVYE METODY I SREDSTVA
RESHENIYA KRAEVYKH ZADACH, KIEV, 1964 P74-84.

DESCRIPTORS: (•INTEGRATORS, ELECTRICAL
NETWORKS), (•ELECTRICAL NETWORKS, •BOUNDARY
VALUE PROBLEMS), AMPLIFIERS,
GATES(CIRCUITS), ELECTRIC CURRENTS, CRYSTAL
OSCILLATORS, MODELS(SIMULATIONS),
COMPUTERS (U)

THIS WORK CONSIDERS THE SYSTEM FOR ASSIGNING THE
BOUNDARY CONDITIONS IN CONTEMPORARY ELECTRONIC
MODELS, THE NEED FOR PROGRAM ASSIGNMENT OF BOUNDARY
CONDITIONS FOR ANY MOMENTS OF TIME, SIMULTANEOUS
ASSIGNMENT OF TIME VARIABLES OF BOUNDARY CONDITIONS,
STORED CONTROL OF CHANNELS FOR ASSIGNING THE BOUNDARY
CONDITIONS, AND THE CONVERSION OF THE UNIQUE
ELECTRONIC INTEGRATOR EI-S INTO THE UNIVERSAL
NETWORK ELECTRONIC MODEL USM-1. THE OPERATING
CONDITIONS OF THE EI-S BOUNDARY CONDITION
ASSIGNMENT SYSTEM ARE GIVEN, AS IS THE FUNCTIONAL
DIAGRAM OF THE SYSTEM. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZE0463

AD-662 878 9/2 12/2
VITRO CORP OF AMERICA EGLIN AFB FLA VITRO SERVICES
DIV
LOGIC, LOGICAL DESIGN AND DIGITAL CIRCUITS, (U)
DEC 67 103P SHERER, H. K. I
CONTRACT: F08635-68-C-0001
MONITOR: APGC TR-67-141

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMPUTER LOGIC, DIGITAL
COMPUTERS), BINARY ARITHMETIC, ALGEBRAS,
DIGITAL SYSTEMS, MATHEMATICAL LOGIC, SPECIAL
FUNCTIONS(MATHEMATICAL), LOGIC CIRCUITS (U)

THE MATERIAL BEGINS WITH A DISCUSSION OF LOGICAL
PROPOSITIONS AND THEIR MATHEMATICAL EXTENSION -
BOOLEAN ALGEBRA. THIS IS FOLLOWED BY VARIOUS
REPRESENTATIONS OF BOOLEAN FUNCTIONS INCLUDING THE
GRAPHICAL METHOD. THE CONCEPT OF DESIGNATION
NUMBERS AS A UNIQUE CIRCUIT DESCRIPTION IS DEVELOPED
FOLLOWED BY SIMPLIFICATION METHODS AND REDUCTION BY
MAPS. APPLICATION OF THESE METHODS TO ACTUAL
CIRCUIT DESIGN IS DEMONSTRATED BY VARIOUS EXAMPLES.
IN THE FINAL PORTION THE MORE COMMON DIGITAL
BUILDING BLOCKS ARE PRESENTED AND DISCUSSED.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZED463

AD-668 205 9/2 9/5
STANFORD RESEARCH INT MENLO PARK CALIF
A PERMUTATION NETWORK,
67 8P WAKSMAN, ABRAHAM I
CONTRACT: NONR-4833(00)

(U)

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF THE
ASSOCIATION FOR COMPUTING MACHINERY, V15 N1 P159-63
JAN 1968.

DESCRIPTORS: (*SWITCHING CIRCUITS,
PERMUTATIONS), (*LOGIC CIRCUITS, DESIGN),
(*COMPUTERS, DESIGN), RELAXATION OSCILLATORS,
SET THEORY, COMBINATORIAL ANALYSIS, ALGORITHMS,
THEOREMS

(U)

IDENTIFIERS: *PERMUTATION NETWORKS, CIRCUIT
THEORY

(U)

THE CONSTRUCTION OF A SWITCHING NETWORK CAPABLE OF
N FACTORIAL-PERMUTATION OF ITS N INPUT TERMINALS TO
ITS N OUTPUT TERMINALS IS DESCRIBED. THE BUILDING
BLOCKS FOR THIS NETWORK ARE BINARY CELLS CAPABLE OF
PERMUTING THEIR TWO INPUT TERMINALS TO THEIR TWO
OUTPUT TERMINALS. THE NUMBER OF CELLS USED BY THE
NETWORK IS $(N \log_2 N + 1) =$
 $\text{SUMMATION FROM } K=1 \text{ TO } K=N \text{ OF THE QUANTITY } (\log_2 K)$. IT COULD BE ARGUED THAT FOR
SUCH A NETWORK THIS NUMBER OF CELLS IS A LOWER BOUND,
BY NOTING THAT BINARY DECISION TREES IN THE NETWORK
CAN RESOLVE INDIVIDUAL TERMINAL ASSIGNMENTS ONLY AND
NOT THE PARTITIONING OF THE PERMUTATION SET ITSELF
WHICH REQUIRES ONLY $(\log_2 N \text{ FACTORIAL}) =$
 $(\text{SUMMATION FROM } K=1 \text{ TO } K=N \text{ OF THE}$
 $\text{QUANTITY } \log_2 K)$ BINARY DECISIONS.
AN ALGORITHM IS ALSO GIVEN FOR THE SETTING OF THE
BINARY CELLS IN THE NETWORK ACCORDING TO ANY
SPECIFIED PERMUTATION. (AUTHOR)

(U)

UNCLASSIFIED

INFORMATION, COMMUNICATION, AND SYSTEMS THEORY

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 2F0463

AD-257 607

HUMAN SCIENCES RESEARCH INC MCLEAN VA

MEASURING THE RELEVANCE OF AN ITEM OF INFORMATION TO
THE COMMAND OF A COMPLEX MAN-MACHINE SYSTEM (U)

JAN 61 IV SCHREIBER, ALVIN L. I

REPT. NO. TN 61 1 SM

CONTRACT: NONR252500

UNCLASSIFIED REPORT

DESCRIPTORS: •COMMUNICATION THEORY, •COMPUTERS,
•MILITARY PERSONNEL, •OPERATIONS RESEARCH, ANALYSIS,
DATA PROCESSING SYSTEMS, DATA STORAGE SYSTEMS, DATA
TRANSMISSION SYSTEMS, DIGITAL COMPUTERS,
EFFECTIVENESS, LEARNING, MATHEMATICAL COMPUTER DATA,
MEASUREMENT, NAVAL PERSONNEL, PROBABILITY, RESEARCH
PROGRAM ADMINISTRATION, TEST METHODS, TESTS (U)

A MATHEMATICAL APPROACH IS PRESENTED ON ONE OF THE
MOST CRITICAL PROBLEMS IN DEVELOPMENT OF COMMAND
CONSOLES AND DISPLAYS, I.E., THE EVALUATION OF THE
RELEVANCE OF POTENTIAL INFORMATION INPUTS. IT MAY
BE APPLIED TO ANY K. L. OF PROPOSED SYSTEM TO
DETERMINE COMMAND INFORMATION REQUIREMENTS WHEN
CURRENT METHODS MAY NOT BE ADEQUATE TO THE TASK.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-260 063

STANFORD RESEARCH INST MENLO PARK CALIF
THE STRUCTURING AND ANALYSIS OF COMPLEX SYSTEM
PROBLEMS (U)

IV SCHAEFFER, X.H.; SHAPER, ALBERT;
CONTRACT: AF49 638 1020
MONITOR: AFOSR 810

UNCLASSIFIED REPORT

DESCRIPTORS: OPERATIONS RESEARCH, ANALYSIS,
COMMUNICATION THEORY, COMPUTERS, DESIGN, HUMAN
ENGINEERING, MATHEMATICAL COMPUTER DATA, SYMPOSIA (U)

MANY COMPLEX SYSTEMS CONSIST OF TOO MANY DIFFERENT
TYPES OF ELEMENTS AND ARE INFLUENCED BY TOO MANY
FACTORS TO LEND THEMSELVES READILY TO
CONCEPTUALIZATION THROUGH MATHEMATICAL MODELS,
WITHOUT INTRODUCING UNREALISTIC OVERSIMPLIFICATIONS.
TO STRUCTURE SUCH SYSTEMS REALISTICALLY, AN
APPROACH HAS BEEN DEVELOPED WHICH BEGINS WITH THE
CLASSIFICATION OF THE ELEMENTS AFFECTING THE SYSTEM
AND THE DETERMINATION OF THE EXISTENCE OF CERTAIN
TYPES OF RELATIONS BETWEEN THESE ELEMENTS. THE
APPROACH WHICH IS KNOWN AS THE SYSTEM ANALYSIS
AND INTEGRATION MODEL (SAIM) HAS BEEN APPLIED
TO THE ANALYSIS OF A NUMBER OF SYSTEM PROBLEMS
CONCERNING WEAPON SYSTEM DEVELOPMENT, INCLUDING
COMMAND AND CONTROL. OTHER PROBLEM AREAS TO WHICH
THE METHOD HAS BEEN APPLIED ARE THE ANALYSIS OF
POSTATTACK RECOVERY, POLITICAL CONFLICTS, AND LARGE-
SCALE ORGANIZATIONS. THE PAPER CONCLUDES WITH A
DISCUSSION OF THE FUNCTION OF THIS GENERAL APPROACH
IN THE DEVELOPMENT OF FORMAL MODELS WHICH
REALISTICALLY REPRESENT COMPLEX SYSTEM PROBLEMS.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFD463

AD-260 505

OPERATIONAL APPLICATIONS OFFICE AIR FORCE ELECTRONIC
SYSTEMS DIV BEDFORD MASS
PLANS FOR MAN-COMPUTER COMMUNICATIONS RESEARCH USING
THE RELIABILITY TEST ASSEMBLY COMPUTER AND THE
ADVANCED DISPLAY CONSOLE AS RESEARCH TOOLS (U)
JUN 61 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *DATA PROCESSING SYSTEMS, *DISPLAY
SYSTEMS, *HUMAN ENGINEERING, COMMUNICATION THEORY,
COMPUTERS, RELIABILITY, TEST EQUIPMENT, TESTS (U)
IDENTIFIERS: SAGE (U)

THE ADVANCED DISPLAY CONSOLE AND RTA COMPUTER
DEVELOPED UNDER SAGE II CONTRACTS WILL BE MODIFIED
FOR USE IN MAN-MACHINE COMMUNICATIONS EXPERIMENTS.
MAN-MACHINE COMMUNICATION PROCEDURE WILL BE STUDIED
IN FIVE ASPECTS: (1) PREPARATION OF DATA TO MAKE
UP VISUAL MESSAGES, (2) PRESENTATION OF THE
MESSAGES, (3) RETRIEVAL OF DATA NOT ALREADY
DISPLAYED, (4) CHOICE BEHAVIOR OF THE MAN, AND
(5) PROCESSING OF THE MAN'S OUTPUT. PRESENT
SCHEDULING INDICATES FULL AVAILABILITY OF THE
EQUIPMENT FOR COMMUNICATIONS EXPERIMENTS BY 1
FEBRUARY 1962. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-268 009

CHICAGO UNIV ILL

IN SEARCH OF THE FUNDAMENTAL UNITS OF PERCEPTION: AN
OUTLINE (U)

JUN 61 IV GREENE, PETER H. I

CONTRACT: AF49 638 414

MONITOR: AFOSR TN60 622

UNCLASSIFIED REPORT

DESCRIPTORS: *COMMUNICATION THEORY, *COMPUTERS,
*PERCEPTION, COMPUTER LOGIC, NERVOUS SYSTEM (U)

MANY PROPERTIES OF NEURONS AND NEURAL NETWORKS MAY
BE DESCRIBED MATHEMATICALLY. THE RELATION OF THESE
PROPERTIES TO PERCEPTION MAY BE UNDERSTOOD, HOWEVER,
ONLY IF ONE HAS SOME IDEA OF THE NATURE OF THE
FUNDAMENTAL UNITS OF PERCEPTION. MUCH STUDY HAS
BEEN DEVOTED TO THE PROBLEM OF HOW THE BRAIN
TRANSFORMS INCOMING SIGNALS INTO USEFUL FORM. AN
AREA OF STUDY WHICH IS COMPARATIVELY UNDEVELOPED IS
INVESTIGATION OF THE ACTIVE ROLE OF THE NERVOUS
SYSTEM IN THE FORGING OF SIGNIFICANT PERCEPTUAL
UNITS; AND THE FITTING OF THESE UNITS TO EXPERIENCE.
THE PRESENT OUTLINE IS DESIGNED AS AN ELEMENTARY
INTRODUCTION TO IDEAS IN THIS AREA. IT IS
INTENDED AS AN ELABORATION OF THE AUTHOR'S PAPER
AN APPROACH TO COMPUTERS THAT PERCEIVE,
LEARN, AND REASON, (PROC. WESTERN JOINT
COMPUTER CONF., 1959, REPRINTED IN GENERAL
SYSTEMS YEARBOOK, VOL. V, 1960), AND AS
AN INTRODUCTION TO MATHEMATICAL RESULTS CITED HEREIN.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-275 535

SCOPE INC RESTON VA

DEVELOPMENT OF AN ADVANCED CONDITIONED REFLEX
MODEL

(U)

IV

UNCLASSIFIED REPORT

DESCRIPTORS: *COMMUNICATION THEORY, *COMPUTER STORAGE
DEVICES, *CONDITIONED REFLEX, *DATA STORAGE SYSTEMS,
*MATHEMATICAL LOGIC, *SIMULATION, CODING, COMPUTERS,
CONTROL SYSTEMS, DESIGN, FEASIBILITY STUDIES,
FEEDBACK, MAGNETIC TAPE, MANGANESE COMPOUNDS,
PHOTOTUBES, PROBABILITY, PROGRAMMING (COMPUTERS),
RESISTORS, SAMPLING, SEQUENCES, STATISTICAL ANALYSIS,
STATISTICAL DISTRIBUTIONS, SWITCHING CIRCUITS (U)

THE DESIGN AND CONSTRUCTION OF AN ADVANCED
LABORATORY CONDITIONED-REFLEX MODEL TO DEMONSTRATE
THE FEASIBILITY OF A CONDITIONED-REFLEX SYSTEM FOR
ECM AUTOMATIC MODE SELECTION. THE ORGANIZATION
OF THE MODEL CONSISTS OF A SENSORY FIELD CONNECTED TO
A DISCRIMINATION FIELD WHICH, IN TURN, IS CONNECTED
TO SEVERAL MEMORY PLANES. EACH MEMORY PLANE IS
ASSIGNED TO A CLASS OF INPUTS AND A RESPONSE IS
EVOKED BY CORRELATING THE STORED INFORMATION WITH
INPUT INFORMATION. THIS ANALYSIS INCLUDES A
PROPOSED ACCEPTANCE TEST PROCEDURE AND A DISCUSSION
FOR USES OF THE MACHINE IN THE LABORATORY. IT ALSO
EMPHASIZES THE THOUGHT GIVEN TO DEMONSTRATING THE
CAPABILITY OF THE HARDWARE MODEL. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-275 549

ARMY ELECTRONIC PROVING GROUND FORT HUACHUCA ARIZ
INVESTIGATION OF MODEL TECHNIQUES

(U)

JUL 61 IV
REPT. NO. SIG 940 43R1

UNCLASSIFIED REPORT

DESCRIPTORS: *COMMUNICATION SYSTEMS, *COMMUNICATION
THEORY, ALGEBRAS, ANALOG COMPUTERS, ANALYSIS,
CATALOGS, DIGITAL COMPUTERS, ELECTRICAL NETWORKS,
LINEAR PROGRAMMING, LINEAR SYSTEMS, NUMERICAL METHODS
AND PROCEDURES, SIMULATION, THEORY, THYRATONS,
TOPOLOGY

(U)

A CATALOG IS PRESENTED OF MODELING TECHNIQUES
APPLICABLE TO THE SIMULATION, ANALYSIS, AND
EVALUATION OF COMMUNICATION SYSTEMS UNDER A VARIETY
OF OPERATIONAL CONDITIONS. THE TECHNIQUES PRESENTED
ARE GENERALIZED NETWORKS, MINIMAL VALUE AND MINIMAL
PATH TECHNIQUES, RESISTOR NETWORKS, BOOLEAN ALGEBRA,
MATHEMATICAL THEORY OF COMMUNICATION (INFORMATION
THEORY), QUEUING THEORY, TOPOLOGY, LINEAR
PROGRAMMING, MONTE CARLO TECHNIQUE, THE
BOLDYREFF FLOODING TECHNIQUE, BROADVIEW INTER
MEDIATE IBM 650 DIGITAL COMPUTER, CASE INSTITUTE
EXPERIMENTAL IBM 650 MODELS, BLOCK LOADING DELAY
MODEL, THE BROADVIEW THYRATRON AND
ELECTROMECHANICAL MODELS, THE ERNIAC, THE NEON
BULB MODEL, THE TACK-O ANALYZER MODEL,
UNIVAC, THE MINIMUM DELAY MODEL, MATRI DESCRIPTION
OF NETWORK, A SYNTHESIS OF MODELING TECHNIQUES FOR
COMMUNICATION NETWORKS, AND DIMENSIONAL ANALYSIS.

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-293 888

PENNSYLVANIA UNIV PHILADELPHIA MOORE SCHOOL OF
ELECTRICAL ENGINEERING
THE TREE AS A STRATAGEM FOR AUTOMATIC INFORMATION
HANDLING

(U)

DEC 62 IV LANDAUER, WALTER I. I

REPT. NO. 63 15

CONTRACT: NONR55140AF30 602 2382

UNCLASSIFIED REPORT

DESCRIPTORS: *COMMUNICATION THEORY, *DATA PROCESSING
SYSTEMS, CODING, COMPUTER LOGIC, COMPUTER STORAGE
DEVICES, COMPUTERS, DATA STORAGE SYSTEMS (U)

THE TREE AS A STRATAGEM FOR AUTOMATIC INFORMATION
HANDLING.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-299 248

GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT
STATION
AUTOMATED SOLUTION OF COMBINED INTERFERENCE
MATRICES

(U)

NOV 62 IV PERLIN, I.E. (TECHNO, R.)
CONTRACT: DA36 D39SC88920

UNCLASSIFIED REPORT

DESCRIPTORS: *COMMUNICATION EQUIPMENT, *COMMUNICATION
SYSTEMS, *COMMUNICATION THEORY, *MATRIX ALGEBRA,
ANTIMISSILE DEFENSE SYSTEMS, DIGITAL COMPUTERS,
INTERFERENCE, PROGRAMMING (COMPUTERS) (U)

A PROCEDURE FOR FINDING ALL PERMISSIBLE BASIC COMMUNICATION
NETWORKS THAT CAN BE DERIVED FROM A GIVEN SET OF MUTUAL
INTERFERENCE MATRICES IS DEVELOPED.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-403 761

ARMY ELECTRONICS LABS FORT MONMOUTH N J
AN APPLICATION OF HEURISTIC PROGRAMMING TO THE
PROBLEM OF THEOREM PROVING BY MACHINE,

(U)

MAR 63 16P AMOROSO, SERAFINO ;

TASK: 3A99 25 004 03

MONITOR: AELRDL

TR2345

UNCLASSIFIED REPORT

DESCRIPTORS: *COMMUNICATION THEORY, FUNCTIONS,
MATHEMATICAL LOGIC, DIGITAL COMPUTERS, DICTION
ARIES, LANGUAGE, VOCABULARY, PROGRAMMING
(COMPUTERS).

(U)

IDENTIFIERS: QUANTIFICATION THEORY, COMIT PRO
GRAM, TRUTH FUNCTIONS.

(U)

A MECHANICAL PROCEDURE USING TRIAL AND ERROR
TECHNIQUES IS OUTLINED WHICH WILL VERIFY, IN A LARGE
NUMBER OF CASES, THE VALIDITY OF AN ARGUMENT FORM
EXPRESSED IN QUANTIFICATION THEORY. COMBINATIONAL
PROCESSES WERE USED TO A MINIMUM EXTENT.
TECHNIQUES OF IMPLEMENTATION FOR A DIGITAL
COMPUTER ARE ALSO DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-406 251

HONEYWELL INC MINNEAPOLIS MINN

COMMAND AND CONTROL SYSTEMS ANALYSIS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

DEC 62 142P

BUTZ, A. R. ; WINRICH, L. B. I

MONITOR: RADC

TDR62 612

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *COMMAND AND CONTROL SYSTEMS,

*OPERATIONS RESEARCH, *MATHEMATICAL MODELS,

STATISTICAL ANALYSIS, DIGITAL COMPUTERS, GAME THEORY,

DECISION MAKING, COMBINATORIAL ANALYSIS, SENSITIVITY,

COMPUTERS, DISPLAY SYSTEMS, PROGRAMMING (COMPUTERS),

MATHEMATICAL ANALYSIS, ANALYSIS, AIR DEFENSE COMMAND (U)

IDENTIFIERS: SAGE, DIGRAPH TECHNIQUES, BAYESIAN

FORMULATIONS, MARKOV PROCESSES

(U)

SYSTEMS ANALYSIS PROCEDURES ARE IMPORTANT FOR DETERMINING THE PROPER ALLOCATION OF INFORMATION HANDLING AND DECISION MAKING FUNCTIONS AMONG THE MEN IN LARGE MAN-MACHINE ORGANIZATIONS SUCH AS MILITARY COMMAND AND CONTROL SYSTEMS. RESEARCH IS REQUIRED FOR MODELING AND ANALYZING THESE FUNCTIONS AND RELATING THE SENSITIVITIES OF THESE FUNCTIONS TO THE SYSTEM CRITERION. THIS REPORT PRESENTS THE STEPS OF A GENERALIZED SYSTEMS ANALYSIS PROCEDURE FOR COMMAND AND CONTROL SYSTEMS. THE STEPS ARE THEN FOLLOWED UTILIZING AN EXISTING SAGE DIRECTION CONTROL SYSTEM AS A VEHICLE FOR THE STUDY. EMPHASIS IS PLACED UPON MODELING THE HUMAN ORGANIZATION AS A WHOLE. (AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-411 274

JOHNS HOPKINS UNIV BALTIMORE MD
REPRESENTATION AND ANALYSIS OF SIGNALS, PART XIV.
TIME-VARYING SYSTEMS WITH SEPARABLE SYSTEM
FUNCTIONS,

(U)

JAN 63 94P WEISS, LEONARD :
CONTRACT: NONR24853

UNCLASSIFIED REPORT

DESCRIPTORS: (*NETWORKS, DIFFERENTIAL EQUA
TIONS), (*SIGNALS, MATHEMATICAL ANALYSIS),
COMMUNICATION THEORY, FUNCTIONS, TIME-LAG
THEORY, MODULATION THEORY, ANALOG COMPUTERS,
CONTROL SYSTEMS, INTEGRAL TRANSFORMS.

(U)

IDENTIFIERS: 1963.

(U)

THE RELATIONSHIP OF THE DIFFERENTIAL EQUATION OF A
SYSTEM TO THE SYSTEM'S WEIGHTING PATTERN (IM PULSE
RESPONSE) IS DISCUSSED. THE REALIZATION OF LINEAR
DIFFERENTIAL SYSTEMS IS DISCUSSED, AND SOME
"TRICKS" REGARDING MANIPULATION OF THE POSITION OF
FUNCTION GENERATORS IN AN ANALOG COMPUTER TYPE
REALIZATION (WITHOUT CHANGING THE INPUT-OUTPUT
RELATION) ARE PRESENTED. TIME VARYING SYSTEMS
DESCRIBABLE BY SEPARABLE S-DOMAIN SYSTEM FUNCTIONS
ARE DISCUSSED. AN S-DOMAIN SYSTEM FUNCTION
 $H(S, T)$ IS DEFINED BY REGARDING THE RESPONSE OF A
LINEAR DIFFERENTIAL SYSTEM TO AN INPUT EST AS
 $H(S, T)EST$. THE INTERPRETATION OF A SEPARABLE
 $H(S, T)$ IN TERMS OF THE CORRESPONDING WEIGHTING
PATTERN AND DIFFERENTIAL EQUATION IS DISCUSSED, AND
IT IS PROVED THAT A SUFFICIENT CONDITION FOR
SEPARABILITY IS THAT $H(S, T)$ BE RATIONAL IN S .
IT IS ALSO SHOWN THAT A NON RATIONAL SEPARABLE
 $H(S, T)$ MUST OF NECESSITY BE A REPRESENTATION OF
A NON-SEPARABLE $H(S, T)$ CONSISTING OF A FINITE
NUMBER OF TERMS. (AUTHOR)

(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-414 776

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
AN INFORMATION-SYSTEM APPROACH TO THEORY OF
INSTRUCTION WITH SPECIAL REFERENCE TO THE TEACHER, (U)
MAR 63 65P RYANS, DAVID G. :

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMMUNICATION THEORY, INSTRUCTORS),
(*INSTRUCTORS, BEHAVIOR), INFORMATION RETRIEVAL,
LEARNING (U)
IDENTIFIERS: 1963 (U)

THIS IS AN ATTEMPT AT CONCEPTUALIZATION OF THEORY BUILDINGS WITH RESPECT TO THE INSTRUCTIONAL PROCESS. THE PURPOSE IS TO BLOCK OUT SOME OF THE CONDITIONS AND BEHAVIORAL CONSTRUCTS WHICH MAY BE HYPOTHEZIZED TO CONTRIBUTE TO TEACHER BEHAVIOR AND THE INSTRUCTIONAL PROCESS. IN THIS PAPER, THE WRITER'S POSITION IS PRESENTED IN DETAIL, ADDITIONAL CONSTRUCTS ARE INTRODUCED AND EMPHASIZED, AND AN EFFORT IS MADE TO LOOK FURTHER INTO SOME OF THE IMPLICATIONS. THE TEACHER SYSTEM AND THE PUPIL SYSTEM ARE DESCRIBED IN TERMS OF THE ESSENTIAL CHARACTERISTICS OF ALL SYSTEMS--INFORMATION FLOW OR INFORMATION PROCESSING. THE INFLUENCING CONDITIONS THAT HAVE LED TO THIS "INFORMATION SYSTEM THEORY OF INSTRUCTION" ARE FOUR: (1) THE THINKING AND THE RESEARCH GROWING OUT OF A TEACHER CHARACTERISTICS STUDY, RELEVANT TEACHER BEHAVIOR RESEARCH REPORTED BY OTHER INVESTIGATIONS, AND EXPERIENCE WITH THE DATA ACCUMULATED IN CONNECTION WITH THE NATIONAL TEACHER EXAMINATIONS; (2) THE INTRODUCTION OF THE CONCEPTS OF "GENERAL SYSTEM THEORY"; (3) SEARS' DIRECTION OF ATTENTION TO THE "DIADIC SEQUENCE" AS AN EXPLANATION OF SOCIAL BEHAVIOR; AND (4) THE GROWING INTEREST IN CONCEPTS ASSOCIATED WITH INFORMATION THEORY AND COMMUNICATION THEORY. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-430 739

RAND CORP SANTA MONICA CALIF

STUDIES IN INFORMATION PROCESSING THEORY: SIMILARITY
AND FAMILIARITY IN VERBAL LEARNING, (U)

FEB 64 36P SIMON, HERBERT A. I

FEIGENBAUM, EDWARD A. I

REPT. NO. RM3979PR

CONTRACT: AF49 638 700

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•COMMUNICATION THEORY, LEARNING),
(•VERBAL BEHAVIOR, LEARNING), (•LEARNING,
COMMUNICATION THEORY), (•DATA PROCESSING SYSTEMS,
THEORY), MODELS (SIMULATIONS), EXPERIMENTAL DATA,
CODING (U)

IDENTIFIERS: INFORMATION PROCESSING THEORY, EPAM-III
MODEL, AURAL RECODING, 1964, VERBAL LEARNING (U)

THIS MEMORANDUM PRESENTS RESULTS OBTAINED BY
SIMULATING VARIOUS VERBAL LEARNING EXPERIMENTS WITH
THE ELEMENTARY PERCEIVING AND MEMORIZING
PROGRAM (EPAM), AN INFORMATION PROCESSING THEORY
OF VERBAL LEARNING. PREDICTIONS WERE GENERATED FOR
EXPERIMENTS MANIPULATING INTRA-LIST SIMILARITY
(UNDERWOOD); INTER-LIST SIMILARITY (BRUCE);
AND, FAMILIARITY AND MEANINGFULNESS. THE STIMULUS
MATERIALS WERE NON-SENSE SYLLABLES, LEARNED IN PAIR-
ASSOCIATE FASHION. A DESCRIPTION OF THE EPAM-III
MODEL IS GIVEN. THE PREDICTIONS MADE BY THE MODEL
ARE GENERALLY IN GOOD AGREEMENT WITH THE
EXPERIMENTAL DATA. IT IS SHOWN THAT THE
QUANTITATIVE FIT TO THE UNDERWOOD DATA CAN BE
IMPROVED CONSIDERABLY BY INTRODUCING A PROCESS OF
"AURAL RECODING." THE FIT OF THE EPAM
PREDICTIONS TO THE CHENZOFF DATA IS PARTICULARLY
SIGNIFICANT SINCE IT LENDS SUPPORT TO THE HYPOTHESIS
THAT THE MECHANISM BY MEANS OF WHICH A HIGH DEGREE OF
MEANINGFULNESS OF ITEMS FACILITATES LEARNING IS THE
HIGH FAMILIARITY OF THESE ITEMS. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-431 113

MAGNAVOX CO TORRANCE CALIF

STUDY OF CORRELATION PROPERTIES OF BINARY SEQUENCES.

(U)

DESCRIPTIVE NOTE: INTERIM REPT. NO. 1, 15 OCT 63-15

JAN 64,

JAN 64 37P GOLD, ROBERT :

REPT. NO. R692

CONTRACT: AF33 615 1011

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CORRELATION TECHNIQUES, COMPUTERS),

(*COMMUNICATION SYSTEMS, SEQUENCES (MATHEMATICS)),

(*PROGRAMMING (COMPUTERS), MATHEMATICAL MODELS),

LINEAR SYSTEMS, ERRORS, COMMUNICATION THEORY,

POLYNOMIALS, MATHEMATICAL ANALYSIS, MATHEMATICAL

LOGIC, ALGEBRAS, CONFORMAL MAPPING, MATRIX

ALGEBRA

(U)

IDENTIFIERS: 1964, EQUIVALENCE, ABSTRACT ALGEBRA,

MERSENNE NUMBERS

(U)

PROPERTIES OF THE CORRELATION PROPERTIES OF THE
LINEAR SEQUENCES ARE DISCUSSED AND A NEW AND
PROMISING APPROACH TO THE PROBLEM OF CORRELATION OF
LINEAR SEQUENCES IS DEVELOPED. FAMILIES OF LINEAR
SEQUENCES OF EQUAL PERIOD ARE GENERATED FROM A SINGLE
SHIFT REGISTER. THE CLASS OF SEQUENCES WITH
BOUNDED CROSS CORRELATION IS DETERMINED AS WELL AS
THE BOUNDS ON THE CROSS CORRELATION FUNCTION OF
CERTAIN MAXIMAL SEQUENCES AND HENCE ON THE
CORRESPONDING FAMILY OF SEQUENCES. THE APPENDIX
PRESENTS A DISCUSSION OF ELEMENTARY PROPERTIES OF
BINARY SEQUENCES, ELEMENTARY ALGEBRAIC PROPERTIES OF
SEQUENCES, AND ERROR CORRECTING CODES. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF043

AD-437 588

HUMAN SCIENCES RESEARCH INC MCLEAN VA
INFORMATION-PROCESSING TASKS IN TACTICAL ACTION
SELECTION: PERFORMANCE OF EXPERIENCED SUBMARINE
OFFICERS IN WEIGHTING MULTIPLE CRITERIA FOR DEPTH
SELECTION.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FOR JAN 62-MAR 64,
MAR 64 150P VAUGHAN, W. S., JR.;

VIRNELSON, T. R.; FRANKLIN, R. D.;

REPT. NO. RR63 26AE

CONTRACT: NONR367100

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DATA PROCESSING SYSTEMS, JOB
ANALYSIS), (*SUBMARINE PERSONNEL, OFFICER PERSONNEL),
HUMAN ENGINEERING, SELECTION, PERFORMANCE TESTS (U)

THE PROBLEM OF HOW TO ALLOCATE TASKS BETWEEN MEN
AND EQUIPMENT COMPONENTS OF A COMMAND AND CONTROL
SYSTEM IS ADDRESSED. SPECIFIC
INFORMATIONPROCESSING STEPS INVOLVED IN THE SELECTION
OF A COURSE OF ACTION FROM AMONG ALTERNATIVES ARE
DEFINED AS THE TASKS TO BE ALLOCATED IN A MAN/
COMPUTER PARTNERSHIP. PERFORMANCE DATA REFLECTING
THE ABILITY OF EXPERIENCED TACTICAL COMMANDERS TO
PERFORM EACH OF THESE FIVE INFORMATION-PROCESSING
TASKS SINGLY AND IN COMBINATION ARE REQUIRED AS A
PART OF THE DATA BASE FOR ALLOCATION DECISION. THE
RESULTS INDICATE THAT ALTHOUGH INDIVIDUAL COMMANDERS
DIFFER FROM ONE ANOTHER IN THE IMPORTANCE THEY ATTACH
TO A SET OF DEPTH SELECTION CRITERIA, ANY ONE OFFICER
IS HIGHLY CONSISTENT OF HIS JUDGMENTS OF IMPORTANCE
AND THESE JUDGMENTS ARE STABLE OVER TIME AND
SENSITIVE TO DIFFERENCES IN THE TACTICAL SITUATION.
(AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-438 430

MITRE CORP BEDFORD MASS

MILITARY INFORMATION SYSTEMS.

(U)

APR 64 22P

JACOBS, J. F. ; BENNETT, E. M.

;

REPT. NO. SP92

CONTRACT: AF19 628 2090

PROJ: 600

MONITOR: ESO TDR63 503

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMMUNICATION SYSTEMS, MILITARY ORGANIZATIONS), (*MILITARY COMMUNICATIONS, INFORMATION RETRIEVAL), DATA PROCESSING SYSTEMS, MILITARY PERSONNEL, AUTOMATION, COMPUTERS

(U)

AN INFORMATION SYSTEM IS CONCERNED WITH THE COMMUNICATION OF CONCEPTS AND DATA ABOUT THE SYSTEM ITSELF AND ITS ENVIRONMENT. MOST OF ITS TIME AND ENERGY IS SPENT IN DESIGNING ITSELF AS A SYSTEM, NOT IN COMMUNICATING STATUS INFORMATION OR ORDERS FOR ACTION. INFORMATION-PROCESSING JOBS ARE ARRANGED HIERARCHICALLY, AND FOR EACH JOB LEVEL, THERE IS A CORRESPONDING LEVEL OF AGGREGATION OF THE CONCEPTS AND DATA USED FOR INFORMATION PROCESSING. HIGH-LEVEL INFORMATION IS FILTERED THROUGH MANY LOWER LEVELS, EACH OF WHICH INTRODUCES SOME DEGREE OF NOISE OR BIAS INTO THE SYSTEM. COMMUNICATION OCCURS BOTH UP AND DOWN THE JOB HIERARCHY; MESSAGES PASSED DOWNWARD GENERALLY INCLUDE CONCEPTS AND DATA THAT DETERMINE SYSTEM OPERATION; MESSAGES PASSED UPWARD ARE USUALLY INDICATIONS OF HOW EFFECTIVELY THE SYSTEM IS DEVELOPING OR OPERATING. THE USE OF COMPUTERS IN INFORMATION SYSTEMS TENDS TO INCREASE SPECIALIZATION AROUND THE LOWER-LEVEL JOBS, AND, CONSEQUENTLY, SYSTEM COMMUNICATION AND INTEGRATION MAY BE INHIBITED. THEREFORE, THE INTRODUCTION OF COMPUTERS INTO INFORMATION SYSTEMS MUST ALWAYS BEGIN AT THE LOWEST LEVEL OF AGGREGATION IN THE JOB HIERARCHY. ONLY THOSE INFORMATION-PROCESSING JOBS WHOSE RULES CAN BE STANDARDIZED PRECISELY ARE SUITABLE FOR AUTOMATION. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z.0463

AD-600 047

IBM WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
SOME PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON
ADAPTATION TO USE THROUGH MAN-MACHINE
INTERACTION. (U)

DESCRIPTIVE NOTE: FINAL REPT. VOL. II, 1 JAN-31
DEC 63,

APR 64 184P KOCHEN, MANFRED :

CONTRACT: AF19 628 2752

PROJ: 5632

TASK: 563205

MONITOR: AFCRL 64 87

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DATA PROCESSING SYSTEMS, COMMUNICATION
THEORY), (*COMMUNICATION THEORY, DATA PROCESSING
SYSTEMS), (*INFORMATION RETRIEVAL, LEARNING),
PROGRAMMING (COMPUTERS), DATA STORAGE SYSTEMS,
DOCUMENTATION, MEMORY, LANGUAGE (U)

THE PROBLEM OF REPRESENTING, STORING, RECALLING AND
PROCESSING OF RELEVANT INFORMATION IN THE
INCREASINGLY COMPLEX ENVIRONMENT OF AN ORGANISM WERE
STUDIED BY SIMULATION BASED ON LIST PROCESSING AND BY
THEORETICAL INVESTIGATION DRAWING ON SOCIOLOGY AND
PSYCHOLOGY OF COGNITION, ENGINEERING STUDIES OF SEMI-
AUTOMATED LIBRARY SYSTEMS, AND MATHEMATICAL THEORY OF
GRAPH AND AUTOMATION. THE FOLLOWING ACCOMPLISHMENTS
WERE MADE: PROGRESS TOWARD A LOGICAL STRUCTURING OF
INFORMATION SCIENCE; CLASSIFICATION OF TYPES OF
DISCOURSE; MODELLING OF AN INFORMATION SYSTEM IN
TERMS OF MEMORY, PROCESSOR AND COMPREHENDER
SUBSYSTEMS GOVERNED BY SELF-REGULATORY PRINCIPLES;
OPERATIONAL ANALYSIS OF SPECIAL INFORMATION SYSTEMS;
SPECIFICATION AND CONSTRUCTION OF COMPUTER PROGRAMS
FOR CONCEPT AND LANGUAGE LEARNING; CRITICAL SURVEY OF
ASSOCIATIVE MEMORIES; KEY-ADDRESS TRANSFORMATIONS FOR
FILE ORGANIZATION; AND CLUSTERING ALGORITHMS BASED ON
MEASURES OF RELEVANCE. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-603 775

JOHNS HOPKINS UNIV BALTIMORE MD

REPRESENTATION AND ANALYSIS OF SIGNALS: PART XVIII:
VECTOR AND TENSOR ALGEBRA OF SIGNALS APPLIED TO
SATELLITE NAVIGATION. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS,

JUL 64 237P ROSS, DAN C. ;

CONTRACT: NONR4010 13

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: THIS RESEARCH WAS SPONSORED BY THE
INTERNATIONAL BUSINESS MACHINES CORPORATION.

DESCRIPTORS: (*MATRIX ALGEBRA, COMMUNICATION THEORY),
(*COMMUNICATION THEORY, MATRIX ALGEBRA), (*NAVIGATION
SATELLITES, COMMUNICATION THEORY), SIGNALS, LINEAR
SYSTEMS, ALGEBRA, SYSTEMS ENGINEERING, DATA PROCESSING
SYSTEMS, FEASIBILITY STUDIES (U)

THE BASIC CONCEPTS OF SIGNALS AND LINEAR SYSTEMS
ARE FORMULATED IN TERMS OF FINITE-DIMENSIONAL VECTOR
ALGEBRA. IMPORTANT IDEAS, OFTEN CONFUSED OR OMITTED
IN CLASSICAL SIGNAL THEORY, ARE CLARIFIED BY THE
SYSTEM OF NOTATION AND NOMENCLATURE PRESENTED IN THE
DISSERTATION. MEASUREMENT AND SPECIFICATION ARE
EMPHASIZED IN THE NOTATION AS IS APPROPRIATE TO THEIR
IMPORTANCE IN ENGINEERING PRACTICE. THE THEORY AND
NOTATION ARE EXTENDED TO FINITE-DIMENSIONAL TENSOR
PRODUCT SPACES. THE EXTENSION TO MULTI-LINEAR
SYSTEMS OF THE ENGINEER'S INTUITIVE KNOWLEDGE OF
LINEAR SYSTEMS IS ILLUSTRATED. THE ABSTRACT
NOTIONS ARE ILLUSTRATED BY APPLICATION TO THE
FAMILIAR PROBLEM OF TIME-DOMAIN MULTIPLICATION.
THE UTILITY OF THE NOTATION AND THE TENSOR PRODUCT
CONCEPTS IS DEMONSTRATED BY APPLICATION TO SATELLITE
NAVIGATION SIGNAL PROCESSING. DESCRIPTIONS OF
FEASIBILITY TESTS ON THE IBM 7094 AND EXCERPTS OF
RESULTS ARE PRESENTED. THE RESULTS CONFIRM THE
EXPECTED SIMPLICITY AND INDICATE A SURPRISINGLY HIGH
ACCURACY OF THE PROCESSOR DESIGNED BY THE TENSOR
PRODUCT APPROACH. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-604 514

RAND CORP SANTA MONICA CALIF
ON COMMUNICATION PROCESSES INVOLVING LEARNING AND
RANDOM DURATION, (U)

OCT 57 6P BELLMAN, RICHARD ;

KALABA, ROBERT ;

REPT. NO. P-1194A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMMUNICATION SYSTEMS, DYNAMIC
PROGRAMMING), (*DYNAMIC PROGRAMMING, COMMUNICATION
SYSTEMS), DECISION THEORY, STOCHASTIC PROCESSES,
LEARNING, COMPUTER STORAGE DEVICES, PROBABILITY (U)

THE FUNDAMENTAL PROBLEM OF DETERMINING THE UTILITY
OF A COMMUNICATION CHANNEL IN CONVEYING INFORMATION
IS VIEWED AS A PROBLEM WITHIN THE FRAMEWORK OF
MULTISTAGE DECISION PROCESSES OF STOCHASTIC TYPE, AND
AS SUCH IS TREATED BY THE THEORY OF DYNAMIC
PROGRAMMING. THE RELATIONS BETWEEN UTILITY AND
CAPACITY, IN SHANNON'S SENSE, ARE INDICATED.
TREATMENT OF COMMUNICATION PROBLEMS INVOLVING THE
USE OF A CHANNEL WHOSE PROPERTIES ARE NOT COMPLETELY
KNOWN, AND THOSE INVOLVING PROCESSES OF RANDOM
DURATION, ARE SHOWN. TREATMENTS OF GENERAL
PROCESSES IN A UNIFORM FASHION BY THE FUNCTIONAL
EQUATION TECHNIQUE OF DYNAMIC PROGRAMMING ARE
DISCUSSED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-605 826

DUNLAP AND ASSOCIATES INC DARIEN CONN
MATHEMATICAL PROGRAMMING TECHNIQUES FOR INFORMATION
SYSTEM DESIGN, (U)

JUL 64 72P GAGLIARDI, U. O. ; YING, C. G.
; HOLT, L. G. ;
CONTRACT: AF19 628 2830
PROJ: 2804
MONITOR: ESD , TDR64 530

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MATHEMATICAL PROGRAMMING,
COMMUNICATION THEORY), (*COMMUNICATION THEORY,
MATHEMATICAL PROGRAMMING), OPERATIONS RESEARCH,
COMMUNICATION SYSTEMS, COMPUTERS, COMMAND AND CONTROL
SYSTEMS, BOMBS, DAMAGE, DETERMINATION, WEAPON SYSTEMS,
DECISION THEORY, STATISTICAL ANALYSIS, EFFECTIVENESS,
DESIGN (U)
IDENTIFIERS: INFORMATION SYSTEMS, BAYES
EFFECTIVENESS (U)

THE PROBLEM OF ESTABLISHING THE EFFECTIVENESS OF AN
INFORMATION SYSTEM IS CONSIDERED. AN EFFECTIVENESS
MEASURE SUGGESTED BY RECENT DEVELOPMENT IN
STATISTICAL DECISION THEORY IS PRESENTED. SAMPLE
EVALUATIONS OR SYSTEM DESIGNS ARE USED TO ILLUSTRATE
HERE THE ADOPTION OF SUCH A MEASURE WHICH ALLOWS
SELECTING THE PARAMETERS OF THE SYSTEM IN A MANNER
CONSISTENT WITH THE USER PREFERENCE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-607 256

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS LAB OF
AVIATION PSYCHOLOGY
AN APPLICATION OF BAYES THEOREM AS A HYPOTHESIS-
SELECTION AID IN A COMPLEX INFORMATION-PROCESSING
SYSTEM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 15 MAR 63-31 JAN 64.

AUG 64 73P SOUTHARD, JACK F. ;
SCHUM, DAVIS A. ; BRIGGS, GEORGE E. ;
CONTRACT: AF33 657 10763
PROJ: 7184
TASK: 718403
MONITOR: AMRL , TDR64 51

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•THREAT EVALUATION, DATA PROCESSING
SYSTEMS), (•DECISION MAKING, THREAT EVALUATION),
(•STATISTICAL ANALYSIS, MILITARY INTELLIGENCE),
COMPUTERS, SIMULATION, PROBABILITY, MATHEMATICAL
PREDICTION, THEOREMS, OFFICER PERSONNEL, AIR DEFENSE,
COMMAND, HUMAN ENGINEERING, PERFORMANCE (HUMAN), REAL
TIME, APPLIED PSYCHOLOGY, SYSTEMS ENGINEERING,

SIMULATION

(U)

IDENTIFIERS: MAN-MACHINE SYSTEMS, BAYES THEOREM

(U)

THE FIRST OF A SERIES OF EXPERIMENTS INVESTIGATING
THE VALUE OF AUTOMATED HYPOTHESIS-EVALUATION AIDS IN
MULTIMANMACHINE SYSTEMS DEVOTED TO ASSESSING OR
DIAGNOSING THREAT IS DESCRIBED. IN THE EXPERIMENT,
AN EIGHT-MAN TEAM EVALUATED THREATS POSED BY A
HYPOTHETICAL AGGRESSOR. THE TEAM MADE THESE
EVALUATIONS ON THE BASIS OF INTELLIGENCE INFORMATION
GATHERED DURING SIMULATED RECONNAISSANCE OVERFLIGHTS
OF AGGRESSOR'S TERRITORY. THE PRIMARY OUTPUT OF
THE THREAT-EVALUATION TEAM WAS THE COMMANDING
OFFICER'S POSTERIOR PROBABILITIES ESTIMATES AS TO
AGGRESSOR'S MOST LIKELY HOSTILE STRATEGIES. DURING
HALF OF THE EXPERIMENTAL TRIALS, THE COMMANDER HAD
ACCESS TO COMPUTER-PRODUCED POSTERIOR PROBABILITIES
BASED UPON A MODIFICATION OF THE BAYES THEOREM.
THE MAJOR EXPERIMENTAL ISSUE WAS WHETHER OR NOT
THESE WOULD AID THE COMMANDER IN HIS HYPOTHESIS
EVALUATION. ALSO INVESTIGATED WAS THE EFFECT OF
DATA-PROCESSING LOAD UPON SYSTEM OPERATION.
ALTHOUGH SOME IMPROVEMENT IN THE POSTERIOR
PROBABILITIES ESTIMATES RESULTED FROM THE COMMANDER'S
HAVING ACCESS TO THE HYPOTHESIS-EVALUATION AID AND
THIS IMPROVEMENT BECAME MORE PRONOUNCED AS SYSTEM (U)

1-9
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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFC463

AD-608 108

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS LAB OF

AVIATION PSYCHOLOGY

SUBJECT CONTROL OVER A BAYESIAN HYPOTHESIS SELECTION

AID IN A COMPLEX INFORMATION PROCESSING SYSTEM. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JUN 63-15 APR 64,

SEP 64 54P SOUTHARD, JACK F. :

SCUM, DAVID A. ; BRIGGS, GEORGE E. :

CONTRACT: AF33 657 10763

PROJ: 7184

TASK: 716403

MONITOR: AMRL , TR64 95

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DECISION MAKING, THREAT EVALUATION),

(*THREAT EVALUATION, DECISION MAKING), MILITARY

PSYCHOLOGY, HUMAN ENGINEERING, INFORMATION RETRIEVAL,

COMPUTERS, MATHEMATICAL PREDICTION, SIMULATION (U)

IDENTIFIERS: BAYES' THEOREM (U)

THIS REPORT DESCRIBES THE SECOND EXPERIMENT IN A SERIES DEVOTED TO ESTIMATING THE EFFECTIVENESS OF AUTOMATED HYPOTHESIS SELECTION IN MAN-MACHINE SYSTEMS IN WHICH THREAT EVALUATIONS OR THREAT DIAGNOSES ARE BEING PERFORMED. IN THE EXPERIMENT AN EIGHT-MAN TEAM PRODUCED EVALUATIONS OF VARIOUS THREATS POSED BY A HYPOTHETICAL AGGRESSOR. THESE EVALUATIONS WERE MADE ON THE BASIS OF INTELLIGENCE INFORMATION GATHERED ON SIMULATED RECONNAISSANCE OVERFLIGHTS OF THE HOMELAND AREA OF THE AGGRESSOR. IBM 1401 AND 7090 COMPUTER FACILITIES PROVIDED THE MEANS FOR GENERATING THE COMPLEX STIMULUS ENVIRONMENT OR DATA BASE. THE PRIMARY OUTPUT FROM THIS THREAT EVALUATION TEAM WAS A SERIES OF A POSTERIORI PROBABILITIES ESTIMATIONS PRODUCED BY THE TEAM'S COMMANDING OFFICER (CO). THESE ESTIMATIONS REPRESENTED THE CO'S JUDGMENTS AS TO THE MOST LIKELY OF THE FOUR RESPONSE ALTERNATIVES AVAILABLE TO AGGRESSOR IN DEPLOYING HIS FORCES ALONG A BORDER OF CONTENTION. THE PURPOSE OF THE EXPERIMENT WAS TO OBSERVE WHETHER INCREASING CONTROL OVER THE MBT-AID MECHANISM WOULD INCREASE THE USER'S ACCEPTANCE OF THE AID AND IMPROVE HIS THREAT-DIAGNOSIS PERFORMANCE. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-615 221

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
STOCHASTIC AGGREGATES AND QUESTIONS IN THE THEORY OF
INFORMATION, (U)

APR 65 140 CHAVCHANIDZE, V. V. ;

REPT. NO. FTD-TT-64-1155

MONITOR: TT , 65-62221

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
AKADEMIYA NAUK Gruzinskoi SSR, TIFLIS, INSTITUT
FIZIKI, TRUDY V8 P277-85 1962.

DESCRIPTORS: (*COMMUNICATION THEORY, GROUPS
(MATHEMATICS)), (*GROUPS (MATHEMATICS), STOCHASTIC
PROCESSES), MATHEMATICAL LOGIC, NUMERICAL METHODS AND
PROCEDURES, PROBABILITY, COMPUTERS, USSR (U)

FINITE MESSAGES ARE CONSIDERED IN THIS WORK. THE
FORMULA OF FINITE MESSAGE ENTROPY IS DEDUCED. IT
IS MORE GENERAL THAN SHANNON'S FORMULA: WHEN THE
LENGTH OF THE MESSAGE N APPROACHES INFINITY,
SHANNON'S FORMULA IS OBTAINED. THE THEORY OF
GENERAL AND BOOLEAN STOCHASTIC AGGREGATES IS
CONSIDERED. THE FORMULA DEDUCED BEFORE IS USED AND
REALIZES THE METHOD OF MARKOV-CHANDRASEKHAR FOR
DISCRETE RANDOM MAGNITUDES. THE INTERPRETATION OF
THE THEORY IS GIVEN IN THE FIELD OF THE ALGEBRA OF
LOGIC. (AUTHOR) (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFD463

AD-615 549

TECHNICAL OPERATIONS INC BURLINGTON MASS
MODELS OF COMMAND AND CONTROL SYSTEMS (WITH
APPLICATIONS TO EXERCISE AND EVALUATION). (U)
DESCRIPTIVE NOTE: FINAL REPT. FOR 30 NOV 63-31 JAN 65,

FEB 65 144P KUGEL, PETER; OWENS, MARTIN
F. 1
CONTRACT: AF19 628 2465
PROJ: 2801
MONITOR: ESO, TOR-65-183

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: COMMAND AND CONTROL SYSTEMS;
MATHEMATICAL MODELS; COMMUNICATION THEORY; COMMAND
AND CONTROL SYSTEMS; DECISION MAKING; OPERATIONS
RESEARCH; SYSTEMS ENGINEERING; DATA PROCESSING
SYSTEMS; AUTOMATA; LOGIC; LANGUAGE; SET THEORY;
ANALYSIS; TAPES; EFFECTIVENESS; PROBABILITY (U)

FIVE MODELS OF THE ACTIVITIES OF COMMAND AND
CONTROL SYSTEMS ARE DESCRIBED TO PROVIDE A PRECISE,
IF NOT NECESSARILY QUANTITATIVE, FRAMEWORK WITHIN
WHICH THE BEHAVIOR OF COMMAND AND CONTROL SYSTEMS CAN
BE STUDIED. THE LOGIC OF INFERENCES MODEL
DESCRIBES INFORMATION PROCESSING AS THE MANIPULATION
OF STRINGS ACCORDING TO EXPLICITLY GIVEN RULES. IN
TERMS OF SUCH A DESCRIPTION, THIS MODEL DEALS WITH
THE PROCESSES OF PROBLEM IDENTIFICATION AND PROBLEM
SOLVING. THE INDUCTIVE INFERENCE MODEL DEALS
WITH INFORMATION PROCESSING FOR WHICH THE SYSTEM MUST
DERIVE THE RULES THAT ARE TO BE USED. IT RELATES
THE ASSUMPTIONS THAT SUCH A SYSTEM MAKES AND THE
INDUCTIVE STRATEGIES THAT IT USES TO THE ADEQUACY OF
ITS PREDICTIONS AND GENERALIZATIONS. THE VALUE
MODEL TREATS A COMMAND AND CONTROL SYSTEM AS A
SYSTEM THAT APPLIES THE VALUES OF THE COMMANDER.
IT ATTEMPTS TO RELATE MEASURABLE FEATURES OF THE
VALUES HELD BY PERSONNEL TO THE KINDS OF DECISIONS
THAT THEY MAKE. THE SEMANTIC MODEL TRIES TO
DEAL WITH THE MANNER IN WHICH COMMAND AND CONTROL
SYSTEMS AND THEIR PERSONNEL REPRESENT THEIR
INFORMATION ABOUT THEIR ENVIRONMENT. THE FINITE
AUTOMATA MODEL TREATS A COMMAND AND CONTROL
SYSTEM AND EXAMINES LIMITATIONS IN CERTAIN TYPES OF
CONTROLLED EXERCISES AS COUPLED SEQUENTIAL MACHINES
(FINITE AUTOMATA). IT PROVIDES A VEHICLE FOR
STUDYING THE ABILITY OF THE EXERCISER TO CONTROL THE
BEHAVIOR OF THE SYSTEM AND FOR STUDYING IN EXERCISE (U)

UNCLASSIFIED

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-615 744

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS LAB OF
ANALYTIC PSYCHOLOGY
THE INFLUENCE OF EXPERIENCE AND INPUT INFORMATION
UPON POSTERIOR PROBABILITY ESTIMATION IN A SIMULATED
THREAT-DIAGNOSIS SYSTEM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 OCT 63-1 ON 64,
APR 65 744 SCHUM, DAVID A. I

GOLOSSTEIN, IRVIN L. GILLTHARD, JACK F. I

CONTRACT: AF33 607 1263

PHOTO: 7184

TASK: 71842

MONITOR: APR 65, TH-65-25

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE.

DESCRIPTORS: (1) THREAT EVALUATION, DECISION MAKING,
(2) DECISION MAKING, SIMULATIONS, (3) PERFORMANCE (HUMAN),
THREAT EVALUATION, (4) COMPUTERS, THREAT EVALUATION,
MATHEMATICAL ESTIMATION, HUMAN ENGINEERING,
PSYCHOLOGY, PROBABILITY
IDENTIFIERS: ANALYSIS OF THE DATA (U)
(U)

TWO EXPERIMENTS WERE CONDUCTED IN WHICH POSTERIOR
PROBABILITY ESTIMATES MADE BY HUMANS WERE COMPARED
WITH SIMILAR ESTIMATES MADE BY A COMPUTER USING A
SPECIFICATION OF DATA. THE FIRST EXPERIMENT INCORPORATING HUMAN
ESTIMATES IN THE DATA WAS TO ESTIMATE, ON
THE BASIS OF INTELLIGENCE DATA FROM A SIMULATED
THREAT-EVALUATION SITUATION, THE LIKELIHOOD OF
VARIOUS ALTERNATIVE HYPOTHESES THAT COULD ACCOUNT FOR
THE OBSERVED DATA. THE PURPOSE OF THE FIRST
EXPERIMENT WAS TO DETERMINE THE EFFECT OF INCREASED
EXPERIENCE UPON THE HUMAN'S ABILITY TO ESTIMATE
POSTERIOR PROBABILITY. THE PURPOSE OF THE SECOND
EXPERIMENT WAS TO DETERMINE HUMAN AND A SIMULATED
POSTERIOR PROBABILITY ESTIMATES UNDER SEVERAL LEVELS
OF INPUT DATA. RESULTS OF THE FIRST EXPERIMENT WERE
AS FOLLOWS: (1) HUMAN POSTERIOR
PROBABILITY ESTIMATES WERE MORE ACCURATE INCREASING
EXPERIENCE TO A POINT WHERE THEY WERE SIMILAR TO
THE COMPUTER ESTIMATES. (2) IN THE EXPERIMENTS,
POSTERIOR PROBABILITY ESTIMATES BY HUMANS WERE
HIGHER THAN POSTERIOR PROBABILITY ESTIMATES BY THE
COMPUTER. (3) THE DATA WERE MORE ACCURATE WITH RESPECT TO
THE POSTERIOR PROBABILITY OF THE PRESENT
EXPERIMENT. (4) THE POSTERIOR PROBABILITY OF
ALTERNATIVE HYPOTHESES WERE SIMILAR TO
THE POSTERIOR PROBABILITY OF THE PRESENT
EXPERIMENT.

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO ZFD463

AD-616 113

CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF
INDUSTRIAL ADMINISTRATION
A RESUME OF MATHEMATICAL RESEARCH ON INFORMATION
SYSTEMS. (U)

DESCRIPTIVE NOTE: MANAGEMENT SCIENCES RESEARCH REPT.,

APR 65 19P KRIEBEL, CHARLES H. I

REPT. NO. MSRR-13

CONTRACT: NONR78024

PROJ: NR047 048

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REVISION OF REPORT DATED FEB 65.

DESCRIPTORS: (*MATHEMATICAL MODELS, COMMUNICATION
THEORY), (*BIBLIOGRAPHIES, COMMUNICATION THEORY),
(*COMMUNICATION THEORY, DATA PROCESSING SYSTEMS),
MANAGEMENT CONTROL SYSTEMS, OPERATIONS RESEARCH,
DOCUMENTATION, MANAGEMENT PLANNING, COMPUTERS (U)
IDENTIFIERS: INFORMATION SYSTEMS (U)

THIS PAPER PRESENTS A CROSS-REFERENCED BIBLIOGRAPHY
ON RESEARCH EMPLOYING MATHEMATICAL MODELS IN THE
STUDY OF INFORMATION SYSTEMS. ALTHOUGH THE LISTING
IS INTENDED PRIMARILY AS A REPRESENTATIVE
INTRODUCTION TO THE LITERATURE, THE ENTRIES CONTAIN
MORE THAN TEN THOUSAND SECONDARY REFERENCES.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFC463

AD-624 431 9/2 5/11
RAND CORP SANTA MONICA CALIF
COMMUNICATIONS, COMPUTERS AND PEOPLE, (U)
NOV 65 21P BARAN, PAUL I
REPT. NO. P-3235

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED FOR PRESENTATION AT THE
FALL JOINT COMPUTER CONFERENCE TO BE HELD IN LAS
VEGAS, DECEMBER 2, 1965.

DESCRIPTORS: (*DATA STORAGE SYSTEMS, COMMUNICATION
SYSTEMS), (*COMMUNICATION SYSTEMS, DATA STORAGE
SYSTEMS), (*SOCIOLOGY, DATA STORAGE SYSTEMS);
DATA PROCESSING SYSTEMS, SOCIAL COMMUNICATION,
DIGITAL COMPUTERS (U)

IMPACT OF THE COMPUTER TECHNOLOGY OF COMMUNICATIONS
BUSINESS IS DISCUSSED AS IS THE INCREASE IN CREATION
OF NEW TYPES OF COMPUTER SYSTEMS RESULTING FROM
WIDESPREAD LOW-COST DIGITAL COMMUNICATIONS. SOCIAL
CONSEQUENCES: LOSS OF THE INDIVIDUAL'S RIGHT TO
PRIVACY; UNSCRUPULOUS INDIVIDUALS MAY USE THE
INFORMATION UNLAWFULLY; ORGANIZED CRIME MAY MISUSE
THE INFORMATION; INFERRENTIAL RELATIONAL RETRIEVAL,
TECHNIQUES COULD DRAW CHAINS OF RELATIONSHIPS BETWEEN
PERSONS, ORGANIZATIONS, AND EVENTS; USE OF PRIVATE
DETECTIVES MAY INCREASE TO UNEARTH DEROGATORY
INFORMATION ON POLITICAL CANDIDATES AND THEIR
ASSOCIATES FOR ESTABLISHING THIN CHAINS OF INFERRED
RELATIONSHIPS; CREATION OF REMOTE INTERROGATION
DEVICES TO INTERACT WITH A FILE FROM A LARGE NUMBER
OF POINTS WILL CUT COSTS OF RETRIEVAL. PROPOSED
SPECIFIC SAFEGUARDS: PROVIDE FOR MINIMAL
CRYPTOGRAPHIC TYPE OF PROTECTION TO COMMUNICATIONS
LINE THAT CARRY EMBARRASSING DATA; NEVER STORE FILE
DATA IN THE COMPLETE 'CLEAR'; MAKE RANDOM EXTERNAL
AUDITING OF FILE OPERATING PROGRAMS STANDARD
PRACTICE; CREATE SENSIBLE, PRECISE GROUND RULES ON
CROSS-SYSTEM INTERROGATION ACCESS FOR INTERCONNECTED
INDIVIDUAL FILE SYSTEMS; PROVIDE MECHANISMS TO DETECT
ABNORMAL INFORMATIONAL REQUESTS; BUILD IN PROVISIONS
TO RECORD THE SOURCE OF REQUESTS FOR INFORMATION
INTERROGATIONS; AND AUDIT INFORMATION REQUESTS AND
INFORM AUTHORITIES OF SUSPECTED MISUSE OF THE SYSTEM.
(U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFD 63

AD-624 658 9/2 5/2
GEORGIA INST OF TECH ATLANTA
A METHOD FOR INVESTIGATING THE BEHAVIOR OF ATTRIBUTES
WHICH BELONG TO INFORMATION STORAGE AND RETRIEVAL
SYSTEMS. (U)
DESCRIPTIVE NOTE: MASTER'S THESIS,
AUG 65 98P HECKMAN, RALPH PAUL ;
CONTRACT: AF33(608)-1234

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INFORMATION THEORY, DATA PROCESSING
SYSTEMS), (*DATA PROCESSING SYSTEMS, INFORMATION
THEORY), INFORMATION RETRIEVAL, DATA STORAGE
SYSTEMS, OPERATIONS RESEARCH, STATISTICAL
ANALYSIS (U)
IDENTIFIERS: THESES (U)

THE PURPOSE OF THIS STUDY IS TO DEVELOP AND APPLY,
BY THE WAY OF ILLUSTRATION, A METHOD FOR
INVESTIGATING THE BEHAVIOR OF ATTRIBUTES WHICH BELONG
TO INFORMATION STORAGE AND RETRIEVAL SYSTEMS.
ALTHOUGH SEVERAL ATTRIBUTES ARE COMMON TO MANY
INFORMATION SYSTEMS, THEIR VALUES DIFFER ACCORDING TO
THE CONDITIONS WHICH ARE PRESENT IN A GIVEN SYSTEM.
AN INVESTIGATION OF THE RELATIONSHIPS BETWEEN THE
CONDITIONS AND THE ATTRIBUTES CAN ENLARGE THE
OPERATIONAL UNDERSTANDING OF THE CONCEPT 'INFORMATION
STORAGE AND RETRIEVAL SYSTEM.' AN OPERATIONAL
UNDERSTANDING OF THIS CONCEPT IS NECESSARY IN ORDER
TO DESIGN THESE SYSTEMS BECAUSE IT PROVIDES AN A
PRIORI KNOWLEDGE ABOUT THE PROBABLE STATE THAT A
SYSTEM WILL ASSUME. THIS STATE IS DEFINED AS THE
VALUES WHICH THE ATTRIBUTES WILL POSSESS UNDER
SPECIFIED CONDITIONS, ONCE THE SYSTEM IS IN
OPERATION. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-628 684 9/4 6/3
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
THE LOEVE-KARHUNEN EXPANSION AS A MEANS OF
INFORMATION COMPRESSION FOR CLASSIFICATION OF
CONTINUOUS SIGNALS. (U)
DESCRIPTIVE NOTE: FINAL REPT. 15 JUL 63-14 JUL 64,
OCT 65 34P WATANABE, SATOSI ;
CONTRACT: AF 33(657)-11347,
PROJ: AF-7233,
TASK: 723305,
MONITOR: AMRL , TR-65-114

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INFORMATION THEORY,
CLASSIFICATION), (*MATHEMATICAL LOGIC,
INFORMATION THEORY), SIGNALS, DATA PROCESSING
SYSTEMS, SERIES, BIOPHYSICS (U)
IDENTIFIERS: LOEVE-KARHUNEN EXPANSION (U)

THE PRESENT PAPER IS CONCERNED MAINLY WITH THE
ASPECT OF INFORMATION COMPRESSION, WHICH IS ONLY PART
OF THE PROCESS OF RECOGNITION. THE PROBLEM OF
ZONING (DIVISION OF THE SPACE INTO DISJOINT VOLUMES
CORRESPONDING TO CLASSES) AND THE PROBLEM OF
DECISION MAKING (SUCH AS THE BAYESIAN
ALGORITHM) REQUIRE, AMONG OTHERS, CAREFUL STUDY IN
CONNECTION WITH CLASSIFICATION AND RECOGNITION, BUT
ARE NOT INCLUDED IN THIS PAPER. (U)

UNCLASSIFIED

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFO463

AD-634 526 9/2 9/4 5/2
OFFICE OF NAVAL RESEARCH WASHINGTON D C
INFORMATION SYSTEMS SUMMARIES, (U)
JUL 65 76P WILCOX, RICHARD H. ;
REPT. NO. ONR-ACK-113,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INFORMATION THEORY, REVIEWS),
(*DATA PROCESSING SYSTEMS, REVIEWS),
DOCUMENTATION, COMPUTERS, COMPUTER LOGIC,
AUTOMATA, LINGUISTICS, PATTERN RECOGNITION,
MACHINES, ELECTRONICS (U)

CONTENTS: GENERAL INFORMATION SCIENCES;
MACHINE INTERACTION WITH HUMANS; IMPROVED
MACHINES. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFO463

AD-655 365 9/4 6/4 5/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
TECHNICAL CYBERNETICS, (U)
APR 67 100P KRAIZMER, L. P. :
REPT. NO. FTD-MT-65-422
MONITOR: TT 67-62360

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TEKHNIЧЕСКАЯ КИБЕРНЕТИКА, EDIYED
MACHINE TRANS. OF MASSOVAYA RADIO BIBLIOTEKA (USSR)
V542 68P 1964.

DESCRIPTORS: (*INFORMATION THEORY,
•CYBERNETICS), INFORMATION RETRIEVAL, DATA
STORAGE SYSTEMS, DATA TRANSMISSION SYSTEMS,
BIONICS, CONTROL SYSTEMS, AUTOMATIC,
COMPUTERS, COMPUTER LOGIC, USSR (L)

THE BASIC IDEAS OF CYBERNETICS ARE POPULARLY
EXPOUNDED AS THE SCIENCE OF THE GENERAL PRINCIPLES OF
CONTROL. PRIMARY ATTENTION IS ALLOTTED TO
TECHNICAL CYBERNETICS, QUESTIONS OF THE CONTROL OF
TECHNICAL PROCESSES, AND THE CREATION OF ARTIFICIAL
CONTROLLING SYSTEMS CONSISTING OF DEVICES FOR
PERCEPTION, TRANSMISSION, STORAGE, AND PROCESSING OF
INFORMATION. ELEMENTARY INFORMATION FROM
INFORMATION THEORY IS GIVEN AS WELL AS THAT ON
AUTOMATIC ADJUSTMENT AND ELECTRONIC COMPUTERS. THE
POSSIBILITIES OF FULFILLMENT BY THE LATTER OF
DIFFERENT LOGICAL FUNCTIONS ARE CONSIDERED. A
CONSIDERABLE QUANTITY OF PRACTICAL APPLICATIONS OF
CYBERNETIC TECHNOLOGY IS DESCRIBED BOTH IN THE FIELD
OF AUTOMATION OF CONTROL, CALCULATION AND PLANNING,
AS WELL AS IN THE FIELD OF SIMULATION OF
PHYSIOLOGICAL PROCESSES IN LIVING ORGANISMS.
BROADER MATERIALS ARE REPRESENTED REGARDING
INFORMATION-LOGICAL MACHINES, INFORMATION CONVERTERS,
SELF-ORGANIZED SYSTEMS, AND BIONIC METHOD, OF
IMPROVING CYBERNETIC TECHNOLOGY. (U)

UNCLASSIFIED

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFD463

AD-658 613 9/4 17/1 17/9
COOK ELECTRIC CO MORTON GROVE ILL
THEORY AND APPLICATIONS OF STATISTICAL WAVE-PERIOD
PROCESSING. VOLUME 1, (U)
JUN 67 632P GERLACH, ALBERT A. ;
CONTRACT: NOBSR-77614
PROJ: SS-06500
TASK: 8183

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN COPYRIGHTED JOURNAL.
SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-658 614;
VOLUME 3, AD-658 615. HARD COPY AVAILABLE FROM COOK
ELECTRIC CO., MORTON GROVE, ILL.

DESCRIPTORS: (*INFORMATION THEORY, STATISTICAL
ANALYSIS), (*SONAR SIGNALS, SPECTRUM
SIGNATURES), (*RADAR SIGNALS, SPECTRUM
SIGNATURES), (*SPECTRUM SIGNATURES,
DETECTION), SIGNAL-TO-NOISE RATIO, SAMPLING,
CODING, OPTIMIZATION, TARGETS, LINEAR SYSTEMS,
NONLINEAR SYSTEMS, CORRELATION TECHNIQUES,
ADAPTIVE SYSTEMS (U)
IDENTIFIERS: WAVE-PERIOD PROCESSING (U)

THE BOOK COVERS IN A COHERENT AND UNIFIED MANNER
THE THEORY AND APPLICATIONS OF INFORMATION PROCESSING
KNOWN TO BE OF IMPORTANCE IN SIGNAL SIGNATURE
RECOGNITION; PARTICULARLY, AS APPLIED TO SONAR AND
RADAR SYSTEMS. CONTENTS OF VOLUME 1 INCLUDE
THE FOLLOWING: INTRODUCTION AND SUMMARY;
ANALYSIS OF LINEAR TRANSMISSION SYSTEMS; LINEAR
THEORY OF SIGNATURE RECOGNITION; STATISTICAL
SAMPLING THEORY; THE STORED REPLICA PHASE-COHERENCE
CROSS-CORRELATOR; THE ADAPTIVE PHASE-COHERENCE
CROSS-CORRELATOR; WAVE-PERIOD MEASURE AND ITS
STATISTICAL PROPERTIES; CODING AND PROCESSING OF
WAVE-PERIOD MEASURE. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-658 614 9/4 17/1 17/9
COOK ELECTRIC CO MORTON GROVE ILL
THEORY AND APPLICATIONS OF STATISTICAL WAVE-PERIOD
PROCESSING. VOLUME II, (U)
JUN 67 6C8P GERLACH, ALBERT A. ;
CONTRACT: NOBSR-77614
PROJ: SS-06500
TASK: 8183

UNCLASSIFIED REPORT
AVAILABLE BY: PUBLISHED IN COPYRIGHTED
JOURNAL.
SUPPLEMENTARY NOTE: HARD COPY AVAILABLE FROM COOK
ELECTRIC CO., MORTON GROVE, ILL. SEE ALSO
VOLUME I, AD-658 613; VOLUME 3, AD-658 615.

DESCRIPTORS: (•INFORMATION THEORY, STATISTICAL
ANALYSIS), (•SONAR SIGNALS, SPECTRUM
SIGNATURES), (•RADAR SIGNALS, SPECTRUM
SIGNATURES), (•SPECTRUM SIGNATURES,
DETECTION), DECISION MAKING, SIGNAL-TO-NOISE
RATIO, CODING, MATHEMATICAL MODELS, MAGNETIC
CORE STORAGE, TARGETS, ANALOG SYSTEMS, ACCURACY,
DISPLAY SYSTEMS, CONTROL SYSTEMS (U)
IDENTIFIERS: WAVE-PERIOD PROCESSING (U)

THE BOOK COVERS IN A COHERENT AND UNIFIED MANNER
THE THEORY AND APPLICATIONS OF INFORMATION PROCESSING
KNOWN TO BE OF IMPORTANCE IN SIGNAL SIGNATURE
RECOGNITION; PARTICULARLY, AS APPLIED TO SONAR AND
RADAR SYSTEMS. CONTENTS OF VOLUME II INCLUDE
THE FOLLOWING: ANALYSIS AND EXPERIMENTS IN
STATISTICAL WAVE-PERIOD PROCESSING; A MODEL
DETECTION PROCESSOR AND ITS OPERATIONAL
CHARACTERISTICS; FALSE TARGET RATE AND PER CENT OF
CLUTTER IN DETECTION PROCESSORS; DESIGN PROCEDURES
FOR WAVE-PERIOD DETECTION PROCESSORS; AUTOMATIC
TARGET LEVEL COMPENSATION FOR WAVE-PERIOD PROCESSORS;
EFFECTS OF SIGNATURE SHEARING IN PRACTICAL
DETECTION PROCESSORS; FINE-GRAIN STATISTICAL WAVE-
PERIOD PROCESSING; INFORMATION STORAGE AND DISPLAY
CONCEPTS FOR AN ACTIVE DETECTION SYSTEM. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-658 615 974 1771 1779
COOK ELECTRIC CO MORTON GROVE ILL
THEORY AND APPLICATIONS OF STATISTICAL WAVE-PERIOD
PROCESSING. VOLUME III. (U)
JUN 67 588P GERLACH, ALBERT A. ;
CONTRACT: NOBSR-77614
PROJ: SS-06500
TASK: 8183

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN COPYRIGHTED JOURNAL.
SUPPLEMENTARY NOTE: SEE ALSO VOLUME I, AD-658 6
VOLUME 2, AD-658 615. HARD COPY AVAILABLE FROM COOK
ELECTRIC CO., MORTON GROVE, ILL.

DESCRIPTORS: (•INFORMATION THEORY, STATISTICAL
ANALYSIS), (•SONAR SIGNALS, SPECTRUM
SIGNATURES), (•RADAR SIGNALS, SPECTRUM
SIGNATURES), (•SPECTRUM SIGNATURES,
DETECTION), GRAPHICS, MATHEMATICAL MODELS,
SIGNAL-TO-NOISE RATIO, DECISION MAKING, TARGETS,
PROBABILITY, TABLES (U)
IDENTIFIERS: WAVE-PERIOD PROCESSING (U)

THE BOOK COVERS IN A COHERENT AND UNIFIED MANNER
THE THEORY AND APPLICATIONS OF INFORMATION PROCESSING
KNOWN TO BE OF IMPORTANCE IN SIGNAL SIGNATURE
RECOGNITION; PARTICULARLY, AS APPLIED TO SONAR AND
RADAR SYSTEMS. CONTENTS OF VOLUME III INCLUDE
THE FOLLOWING: GRAPHICAL PRESENTATIONS OF MODEL
WAVE-PERIOD PROCESSOR PERFORMANCE CHARACTERISTICS;
TABLES OF MODEL WAVE-PERIOD PROCESSOR PERFORMANCE
AND SUPPORTING DATA. (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZFO463

AD-658 773 9/4 9/2 17/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB
ANALOG SOURCE DIGITIZATION: A COMPARISON OF THEORY
AND PRACTICE. (U)
DESCRIPTIVE NOTE: REVISED ED.:
JUL 66 5P GOBLICK, THOMAS J., JR.:
HOLSINGER, JEROME L.:
REPT. NO. JA-2646
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-67-470

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN IEEE TRANSACTIONS ON
INFORMATION THEORY VIT13 N2 P323-6 APR 1967.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH DEFENSE
RESEARCH CORP., SANTA BARBARA, CALIF. REVISION
OF MANUSCRIPT SUBMITTED 10 MAR 66.

DESCRIPTORS: (•INFORMATION THEORY, •ANALOG-TO-
DIGITAL CONVERTERS), DATA TRANSMISSION SYSTEMS,
DATA PROCESSING SYSTEMS, STATISTICAL PROCESSES,
CODING (U)

THE OUTPUT OF AN ANALOG SOURCE IS OFTEN CONVERTED
TO DIGITAL FORM FOR TRANSMISSION OVER A NOISY
CHANNEL. OVERALL COMMUNICATION SYSTEM EFFICIENCY
DEMANDS THAT THIS DIGITIZATION BE DONE IN A MANNER
THAT MINIMIZES THE DATA RATE REQUIRED TO ACHIEVE A
CERTAIN LEVEL OF FIDELITY IN THE WAVEFORM
RECONSTRUCTED AT THE RECEIVER. THE INFORMATION
RATE OF THE SOURCE WITH RESPECT TO A FIDELITY
CRITERION PROVIDES THE MINIMUM OF THIS DATA RATE
CONSISTENT WITH THE FIDELITY CRITERION FOR ANY
DIGITIZATION SCHEME. AN ANALOG SOURCE IS MODELLED
AS A STATIONARY, GAUSSIAN PROCESS WITH MEAN SQUARE
ERROR AS THE FIDELITY CRITERION. THE GAPS IN
PERFORMANCE BETWEEN SOME PRACTICAL DIGITIZATION
SYSTEMS EMPLOYING FILTERS, SAMPLERS, AND QUANTIZERS
AND THE THEORETICAL LIMITATIONS ARE THEN CALCULATED.
FOR THIS MODEL, ONE IS THEN IN A POSITION TO JUDGE
THE WORTH OF THESE SIMPLE DIGITIZATION SCHEMES AND TO
ILLUSTRATE EXPLICITLY THE MAXIMUM POTENTIAL PAYOFF OF
FURTHER RESEARCH IN EFFICIENT DIGITIZATION
TECHNIQUES. (AUTHOR) (U)

UNCLASSIFIED

UNCLASSIFIED

DDC REPORT B. BIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-663 958 2/4 5/6
PENNSYLVANIA, IN. PHILADELPHIA MOORE SCHOOL OF
ELECTRICAL ENGINEERING
COMPUTER AND INFORMATION SCIENCES AND THE COMMUNITY
OF DISCIPLINES, (U)
NOV 66 23P GORN, SAUL I
CONTRACT: DA-31-124-AR0101-98, AF 3016021-3030
PROJ: DA-2001-45012140
MONITOR: AR00 416613

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN BEHAVIORAL SCIENCE V12
N6 PH13-97 NO. 1967.

DESCRIPTORS: (INFORMATION THEORY, REVIEWS),
CYBERNETICS, INFORMATION RETRIEVAL, SOCIAL
SCIENCES, COMPUTERS, EDUCATION, MATHEMATICAL
MODELS, PROGRAMMING LANGUAGES, ARTIFICIAL
INTELLIGENCE, SCIENTIFIC RESEARCH (U)
IDENTIFIERS: INFORMATION SCIENCES (U)

THE AUTHOR DISCUSSES THE COMPUTER AND INFORMATION
SCIENCES, WHICH HE CONSIDERS A NEW DISCIPLINE. HE
CONSIDERS HOW THIS NEW SCIENCE HAS BEEN AFFECTING
OTHER SCIENCES, ARTS, AND PROFESSIONS. THE
APPROACH IS A PHILOSOPHIC ATTITUDE WHICH THE AUTHOR
CALLS CYBERNETIC PRAGMATISM, WITHIN WHICH A MODEL IS
GIVEN OF THE GROWTH AND INTERRELATIONSHIP OF
INFORMATION SYSTEMS AND THE ORGANIZATIONS WHICH USE
THEM. THE DISCUSSION CONCLUDES WITH A SECTION ON
INTERDISCIPLINARY POLITICS AND A REEVALUATION OF
LIBERAL ARTS EDUCATION. (U)

UNCLASSIFIED

UNCLASSIFIED

JOINT REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-664 649 YCH
NAVAL RESEARCH LAB WASHINGTON D C
POWER SPECTRUM ESTIMATES OF SAMPLED PSEUDO-RANDOM
SEQUENCES (U)
DESCRIPTIVE NOTE: INTERIM REPT.,
DEC 67 1920 MCCORMACK, DWELL, JR;
REPT. NO. NML-6673
PROJ. REF-101-03-444-4054

UNCLASSIFIED REPORT

DESCRIPTORS: INFORMATION THEORY, POWER
SPECTRA, CORRELATION TECHNIQUES, SAMPLING,
STATISTICAL ANALYSIS, RANDOM VARIABLES, PERIODIC
VARIATIONS, INTEGRAL TRANSFORMS, DIGITAL SYSTEMS,
SHIFT REGISTERS, BANDWIDTH, THRESHOLD (U)
IDENTIFIERS: PSEUDO-RANDOM SEQUENCES,
AUTOCORRELATION FUNCTION, ELECTROMAGNETIC NOISE (U)

THE REPORT CONCERNS POWER SPECTRUM ESTIMATES OF
SAMPLED PSEUDO-RANDOM SIGNALS, AND SHOWS THAT FOR
THESE SIGNALS THE SPECTRAL PLAIN IS MORE RELEVANT
THAN THE AUTOCORRELATION FUNCTION. THE POWER
SPECTRUM ESTIMATES CONSIDERED BOTH ASSUME
STATIONARITY AND ZERO MEANS. THE SIGNAL UNDER
INVESTIGATION IS A PSEUDO-RANDOM NOISE SIGNAL
OBTAINED FROM MAXIMUM LENGTH SEQUENCES. PSEUDO-
RANDOM SIGNALS AND THEIR DELAYED VALUES CAN
BE PRODUCED WITH RELATIVE EASE FROM LINEAR SHIFT
REGISTERS. IN OTHER DETERMINISTIC WAVEFORMS HAVE
UNIFORM POWER THROUGHOUT THEIR BANDWIDTHS, AND
THEIR AUTOCORRELATIONS ARE APPROXIMATELY ZERO
OUTSIDE A NARROW PEAK AT ZERO LAG. THIS STUDY IS
CONCERNED WITH THE APPLIED METHODS AND RESULTS OF
THESE APPLICATIONS TO BANDLIMITED SIGNALS THAT HAVE
BEEN CORRUPTED BY ADDITIVE NOISE, MULTIPATH, AND
CHANNEL EFFECTS AND THAT HAVE BEEN PROCESSED
DIGITALLY TO OBTAIN CORRELATIONS AND POWER SPECTRA.
THE OBJECT WAS TO OBSERVE THE EFFECTS IN THE POWER
SPECTRUM ESTIMATES DUE TO THESE PERTURBATIONS. THE
ANALYSIS WAS PERFORMED CALCULATIVELY ON FILTERED
MAXIMUM LENGTH PSEUDO-RANDOM SEQUENCES. THESE
FILTERED SEQUENCES WERE FILTERED TO A BANDWIDTH AND
SAMPLED TO YIELD OPTIMAL RESULTS FOR A GIVEN
COMPUTER MEMORY CAPABILITY. (AUTHOR) (U)

UNCLASSIFIED

DOI REPORT 68-0616 SEARCH CONTROL NO. ZF0463

AD-667 097 22/2 20/4 20/13 1/1
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS
AND ASTRONAUTICS
A CHARACTERISTICS APPROACH TO RADIATION
GASDYNAMICS, (U)
F. 68 17P FINKLEMAN, DAVID I
CONTRACT: AF 49(638)-1621
PROJ: AF-9781
TASK: 9/6102
MONITOR: AFOSR 68-0616

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS OF AIAA
AEROSPACE SCIENCES MEETING (6YH), 22-4 JAN 68,
NEW YORK, PAPER NO. 68-163.

DESCRIPTORS: (•) REENTRY VEHICLES, HYPERSONIC
CHARACTERISTICS; THERMAL RADIATION, SLENDER
BODIES, ONE-DIMENSIONAL FLOW, ABSORPTION, SHOCK
WAVES, ENTROPY, FLOW FIELDS, EMISSIVITY,
DESIGN, PISTONS (U)
IDENTIFIERS: METHOD OF CHARACTERISTICS, GAS
DYNAMICS, BLOWING, SUCTION (U)

SINCE THE EQUATIONS WHICH GOVERN UNSTEADY RADIATION
GAS-DYNAMICS ARE HYPERBOLIC, GENERAL SITUATIONS ARE
ATTACKED WITH A NUMERICAL METHOD OF CHARACTERISTICS.
UPSTREAM ABSORPTION OF SHOCK LAYER RADIATION IS
INCLUDED, AND IT IS PROVED THAT ONLY MARK RADIATION
BOUNDARY CONDITIONS ARE APPROPRIATE TO A P SUB 1
DIFFERENTIAL APPROXIMATION OF ONE-DIMENSIONAL
RADIATIVE FIELDS. FLOW FIELDS GENERATED BY PISTONS
INSERTED INTO IDEAL GASES WITH ARBITRARY ABSORPTION
PROPERTIES ARE INVESTIGATED WITH THE DIFFERENTIAL
APPROXIMATION AND THE FULL TRANSFER EQUATION.
RESULTS SHOW THAT THE DIFFERENTIAL APPROXIMATION
PREDICTS SURFACE PRESSURES AND HEAT TRANSFER RATES
ACCURATELY AND THAT LINEAR THEORIES MAY BE IN ERROR.
NONMONOTONIC SURFACE PRESSURE HISTORIES ARE NOTED,
AND IT IS OBSERVED THAT SURFACE EMISSIVITIES AND
TEMPERATURES EXERT 'BLOWING' OR 'SUCTION' UPON
ENTROPY LAYERS. UPSTREAM ABSORPTION IS A DOMINANT
MECHANISM IN FLOW FIELD EVOLUTION, AND THE EFFECTS OF
RADIATION UPON PRESSURE AND VELOCITY MAY BE
COMPARABLE TO THOSE UPON TEMPERATURE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-6 9 283 20/14 17/2.1 9/4
INSTITUTE FOR TELECOMMUNICATION SCIENCES BOULDER COLO
CHANNEL SIMULATION-DIGITAL VS. ANALOG. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 68 54P QUINCY, E. A. ;
REPT. NO. ITS-60
MONITOR: ERL 70

UNCLASSIFIED REPORT

AVAILABILITY: HARD COPY AVAILABLE FROM
SUPERINTENDENT OF DOCUMENTS, GPO, WASHINGTON, D.
C. 20402 \$0.25.

DESCRIPTORS: (*INFORMATION THEORY, MULTIPATH
TRANSMISSION), (*MULTIPATH TRANSMISSION,
SIMULATION), INTEGRAL TRANSFORMS, TRANSFER
FUNCTIONS, ANALOG-DIGITAL COMPUTERS, DIGITAL
COMPUTERS, REAL TIME, COSTS, HIGH FREQUENCY (U)
IDENTIFIERS: TROPOSPHERIC SCATTER COMMUNICATION,
COMPUTER SIMULATION, COST ANALYSIS (U)

A COMPARISON IS MADE OF DIGITAL COMPUTERS AND
SPECIALLY CONSTRUCTED ANALOG (HYBRID) DEVICES FOR
SIMULATION OF RANDOM, TIME-VARIANT, TIME- AND
FREQUENCY-DISPERSIVE CHANNELS. THE COMPARISON IS
MADE PRIMARILY ON AN ECONOMIC BASIS; HOWEVER,
EMPHASIS IS ALSO GIVEN TO THE COMPUTER SPEED REQUIRED
FOR REAL-TIME DIGITAL SIMULATION. A PHYSICALLY
ORIENTED CHANNEL MODEL IS PRESENTED. A COST
ANALYSIS IS PRESENTED. TYPICAL TROPOSCATTER (1
MHZ BW AND 1 MICROSEC. DISPERSION) AND HF (3
KHZ BW AND 1.5 MS DISPERSION) CHANNELS ARE
CONSIDERED AS SPECIFIC EXAMPLES. PRESENT-DAY
GENERAL PURPOSE DIGITAL COMPUTERS AND THE FASTEST
SIGNAL PROCESSORS AVAILABLE ARE SHOWN TO REQUIRE
APPROXIMATELY THE SAME AMOUNT OF COMPUTING TIME FOR
SIMULATION. NEITHER IS CAPABLE OF REAL-TIME
SIMULATION OF EITHER AN HF OR TROPOSCATTER CHANNEL.
(AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZF0463

AD-806 373 17/2 9/2 9/5
NORTHWESTERN UNIV EVANSTON ILL INFORMATION-PROCESSING AND
CONTROL SYSTEMS LAB
ANALYSIS AND DESIGN OF COMMUNICATION NETWORKS WITH
MEMORY. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
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UNCLASSIFIED REPORT

DESCRIPTORS: (*COMMUNICATION SYSTEMS,
NETWORKS), OPTIMIZATION, EQUATIONS, LINEAR
PROGRAMMING, GRAPHICS, TRANSMISSION LINES,
ROADS, COMPUTER STORAGE DEVICES, DATA STORAGE
SYSTEMS; TRAFFIC (U)

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NECESSARILY TIME INVARIANT. THE FORMULATION LEADS
TO A LINEAR PROGRAMMING PROBLEM. SOME
GENERALIZATIONS AND JUSTIFICATIONS OF THE CHOICE OF
THE MODEL ARE DISCUSSED. THE SAME BASIC
FORMULATION CAN BE USED AS A TOOL FOR ANALYSIS AS
WELL AS LEAST-COST DESIGN OR IMPROVEMENT OF AN
EXISTING NETWORK. DESIGN OF TRAFFIC MEMORY SYSTEMS AND
ITS RELATION WITH MESSAGES WITH PRIORITIES IS
CONSIDERED. SIMILAR CONCEPTS ARE USED TO ARRIVE AT
AN APPROXIMATE LINEAR PROGRAMMING FORMULATION OF
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*NATIONAL BIOMEDICAL RESEARCH
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•TEXAS UNIV AUSTIN LABS FOR
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*BAKER, JAMES D

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*BELL, WILLIAM V.

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COLLECTED PAPERS ON SWITCHING
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*BRADHAM, GILBERT B.

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*BRIGGS, GEORGE E.

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*BUTLER, BLAINE R., JR

THE STUTTERING PROBLEM CONSIDERED
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*BUTZ, A. R.

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*CANNON, LYNN E.

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FOR MATRIX OPERATIONS.

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*CARMODY, R. W.

COMPUTER-ASSISTED INSTRUCTION FOR
THE NATIONAL MILITARY COMMAND
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*CARRUTH, DONALD E.

DREAC DRUM EXPERIMENTAL AUTOMATIC
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*CHAPMAN, ROBERT L

DESIGN AND USE OF MAN-MACHINE
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*CHAVCHANIDZE, V. V.

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IN THE THEORY OF INFORMATION.

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*CLAPP, L. C.

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*COGSWELL, JOHN F.

ANALYSIS OF INSTRUCTIONAL SYSTEMS.

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*COLOMB, ROBERT M.

INFORMATION HANDLING PROPERTIES OF
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*COLVIN, R. L.

COMPUTERIZED TRAINING INPUT PLAN
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*CONNELLY, EDWARD M.

ELECTRONIC SIMULATION OF THE
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*CONNER, RICHARD D.

COMPUTERIZED TRAINING INPUT PLAN
FOR NUCLEAR POWERPLANT OPERATORS.
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*COONS, S. A.

INVESTIGATIONS IN COMPUTER-AIDED
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*COULSON, JOHN E.

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*COULTER, N. A., JR.

ON THE STRUCTURE AND ORGANIZATION
OF THE NERVOUS SYSTEM FROM AN
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MOTORCONTROL).
AD-608 284

*CRADWICK, C. C.

LINEAR CIRCUIT ANALYSIS BY MEANS OF
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*DAVIS, DANIEL J.

COMPUTER-AIDED TECHNICAL TRAINING
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*DEHAVEN, JAMES C.

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*DELAND, EDWARD C.

EXAMPLE OF A LARGE-MODEL SIMULATION
OF THE BLOOD BIOCHEMICAL SYSTEM,
AD-619 704

*DUGGAR, BENJAMIN C.

DESIGN AND USE OF INFORMATION
SYSTEMS FOR AUTOMATED ON-THE-JOB
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INSTRUCTIONAL FEATURES,
AD-602 042

*DUNN, ROBERT M.

DESIGN AND USE OF INFORMATION
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TRAINING. VOLUME IV. GRAPHICAL
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AD-616 551

*DUNN, ROBERT M.

APPLICATION OF BOOLEAN ALGEBRA TO
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NETWORKS.
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*ECKLES, JAMES E.

QUANTITATIVE METHODS IN COMPUTER-
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*EDWARDS, WARD

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*EGBERT, R. E.

ANALYSIS OF INSTRUCTIONAL SYSTEMS.
AD-632 462

*EINHORN, S. N.

MAGNETIC PARAMETRON LOGIC ELEMENTS
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*ELSEY, JOHN

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- *ELSPAS, BERNARD
* * *
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- *ESTAVAN, D. P.
* * *
ANALYSIS OF INSTRUCTIONAL SYSTEMS.
AD-632 462
- *FEIGENBAUM, E. A.
* * *
COMPUTER SIMULATION OF HUMAN
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- *FEIGENBAUM, EDWARD A.
* * *
STUDIES IN INFORMATION PROCESSING
THEORY: SIMILARITY AND FAMILIARITY
IN VERBAL LEARNING.
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- *FINKLEMAN, DAVID
* * *
A CHARACTERISTICS APPROACH TO
RADIATION GASDYNAMICS.
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- *FINLEY, F. RAY
* * *
A CORRELATIONAL STUDY OF
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MUSCLE CONTRACTION DURING VARYING
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- *FLAUGHER, JAMES
* * *
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* * *
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* * *
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- *FORD, JOHN D., JR.
* * *
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- *FOX, H. L.
* * *
A QUANTUM OPTICAL PHENOMENON:
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AD-661 089
- *FRANKLIN, R. D.
* * *
INFORMATION-PROCESSING TASKS IN
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MULTIPLE CRITERIA FOR DEPTH
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- *FRIICHTENICHT, RICHARD D.
* * *
AN EXPERIMENTAL STUDY OF THE USES
OF TERNARY LOGIC IN DIGITAL
COMPUTERS.
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- *FUHR, WILLIAM H.
* * *
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- *GAGLIARDI, U. O.
* * *
MATHEMATICAL PROGRAMMING TECHNIQUES
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- *GAINES, R. S.
* * *
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* * *
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- *GERLACH, ALBERT A.
* * *

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*GERSTEIN, GEORGE L.

NEURONAL SPIKE TRAINS AND
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*GERVINSKI, JUDY M.

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*GIL, ARTHUR

ANALYSIS OF LINEAR SEQUENTIAL
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*GILSTRAP, L. O., JR

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MONOTYPE SYSTEM THEORY AND
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AD-428 087

*GOBLICK, THOMAS J., JR

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AD-658 776

*GOERNER, JOHANNES G.

NONLINEAR PREPROCESSING OF INPUTS
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AD-645 499

*GOFFMAN, WILLIAM

MATHEMATICAL FORMULATION OF BASIC
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*GOLD, ROBERT

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*GOLDBERG, J.

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*GOLDSTEIN, IRWIN L.

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*GORN, SAUL

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*GREEN, M. W.

CELLULAR ARRAYS FOR LOGIC AND
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*GREENE, PETER H

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*GRODINS, FRED S.

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*GRUENKE, ROGER ALLAN

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*GUTENMAKHER, L. I.

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*HAASE, KURT H.

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*HALPERT, D.T.

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BIBLIOGRAPHY,

AD-404 086

*HALSEY, JESSE W.

OPTIMIZING THE ASSIGNMENT PROBLEM
IN THE SYNTHESIS OF SEQUENTIAL
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AD-610 771

*HAN, MIEKO S.

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*HANEY, R. D.

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*HARABEDIAN, ALBERT

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*HARDJOURT, CYRUS O.

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*HECKMAN, RALPH PAUL

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TO INFORMATION STORAGE AND
RETRIEVAL SYSTEMS.

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*HILGEMAN, JONATHAN B

A METHODOLOGICAL APPROACH TO THE
ANALYSIS AND AUTOMATIC HANDLING OF
TASK INFORMATION FOR SYSTEMS IN THE
CONCEPTUAL PHASE,

AD-419 018

*HILLSMAN, WILLIAM CLARKE

DIGITAL COMPUTER SIMULATION OF
VISUAL INFORMATION PROCESSING IN
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*HOLSINGER, JEROME L.

ANALOG SOURCE DIGITIZATION: A
COMPARISON OF THEORY AND PRACTICE.

AD-658 776

*HOLT, L. G.

MATHEMATICAL PROGRAMMING TECHNIQUES
FOR INFORMATION SYSTEM DESIGN,

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*HOLUB, PAUL H.

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*HOPKINS, DONN ARTHUR

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*HUGGETT, GEOFFREY

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*HULLS, L. ROBIN

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*JACOBS, J. F.

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*JOHNSON, RICHARD A

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*JOHNSON, ROGER L.

THE USE OF PROGRAMMED LEARNING AND
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*JORDAN, NEHEMIAH

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*JUSTICE, KEITH E.

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DYNAMICS OF EVOLVING BIOLOGICAL
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*KALABA, ROBERT

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*KAPLAN, RICHARD J

A STUDY IN PROBABILISTIC
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*KAUTZ, WILLIAM H.

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*KERNAN, JOSEPH E., JR

COMPUTER-AIDED ANALYSIS OF A
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*KINDRED, J.

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STATE-LOGIC RELATIONS IN AN
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*KLOCK, H. F.

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*KOCHEN, MANFRED

SOME PROBLEMS IN INFORMATION
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*KOPSTEIN, FELIX F.

COMPUTER-ADMINISTERED INSTRUCTION
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*KORYAKOV, V. G.

ON THE USE OF UNIVERSAL ELECTRONIC
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*KRAIZMER, L. P.

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*KRIEBEL, CHARLES H.

A RESUME OF MATHEMATICAL RESEARCH
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*KUGEL, PETER

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*LANDAUER, WALTER I

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*LAVALLEE, PIERRE

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AD-612 642

*LEDLEY, ROBERT S

COLLECTED PAPERS ON SWITCHING
CIRCUIT THEORY AND LOGICAL AND
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AD-266 580

*LEE, R. J.

THEORY OF PROBABILITY STATE
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MONOTYPE SYSTEM THEORY AND
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AD-428 097

*LEVIEN, R.E

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*LEVY, S.

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*LEWIS, MARY ELEANOR

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*LICKLIDER, J. C. R.

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*LOEV, DAVID

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*MACGREGOR, R. J.

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*MALONEY, JAMES V., JR

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*MARON, M. E

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*MAY, W.

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* * *

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* * *

DESIGN AND USE OF INFORMATION
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* * *

DESIGN AND USE OF INFORMATION
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* * *

FACTORS AFFECTING INFORMATION
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*MCCANDLISH, S. G.

* * *

INVESTIGATIONS IN COMPUTER-AIDED
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*MCCLELLAND, WILLIAM A.

* * *

TRAINING RESEARCH UTILIZING MAN-
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*MCCOY, CALDWELL, JR

* * *

POWER SPECTRUM ESTIMATES OF SAMPLED
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*MELCHING, WILLIAM H.

* * *

A CONCEPT OF THE ROLE OF MAN IN
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*MELTON, ARTHUR W.

* * *

HUMAN PERFORMANCE IN INFORMATION

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*MENDER, K. S.

* * *

SYNTHESIS OF SEQUENTIAL SWITCHING
NETWORKS.
AD-608 881

*MERRILL, ROY DEWITT, JR

* * *

SYMMETRIC TERNARY SWITCHING
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* * *

IMPLEMENTATION OF COMPUTER SOFTWARE
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*MEYER, JOHN K.

* * *

EFFECTIVENESS OF PROGRAMMED
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COMPUTER FLOW CHART DESIGN.
AD-630 981

*MILLER, H.S

* * *

MAJORITY LOGIC BY GEOMETRIC METHODS
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*MILLER, ROBERT B

* * *

DESIGN AND USE OF MAN-MACHINE
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*MILLER, ROBERT B.

* * *

PSYCHOLOGY FOR A MAN-MACHINE
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*MINNICK, R. C.

* * *

CELLULAR ARRAYS FOR LOGIC AND
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*MINNICK, ROBERT C.

* * *

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*NISHKIN, E.

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*MOORE, GEORGE P.

A DEFENSE OF NEURAL MODELLING,
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AD-650 346

*MORIWAKI, YOSHI

FURTHER CONTRIBUTIONS TO THE
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*MORRILL, C.S.

PROGRAMMED INSTRUCTION. A SELECTED
BIBLIOGRAPHY,
AD-404 086

*MULLOCK, PHILIP J

MATHEMATICAL CIRCUIT ANALYSIS AND
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*MURONSKII, A. V.

ASSIGNMENT AND PROGRAM CONTROL OF
BOUNDARY CONDITIONS DURING SOLUTION
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*NEWMAN, J. ROBERT

A STUDY IN PROBABILISTIC
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*NICHOLS, A. J., III.

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*NORTHROP, JUDI L.

DEVELOPMENT AND EVALUATION OF SELF-
INSTRUCTIONAL TEXTS AND AN
OPERATIONAL SPECIFICATION FOR
COMPUTER DIRECTED TRAINING IN
INTERMEDIATE QUERY LANGUAGE, MODEL
11, FOR SYSTEM 473L, UNITED STATES
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AD-649 051

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This unclassified and unlimited bibliography contains 186 references concerning Computer-Aided Logical Processes. The references include all research dealing specifically with the processes of information handling and the application of fundamental mathematical theory to the construction or better understanding of information systems. The citations are grouped under six major headings: Computer Logic; Biological Information Handling; Human Factor Information Handling; Programmed Instruction; Network and Switching Systems Theory; and Information, Communication, and Systems Theory.		

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