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ABSTRACTS PERTAINING TO COMMUNIST CHINA
 IN SOVIET ABSTRACTS JOURNALS
 No. 44
 (Physics, Mechanics, and Astronomy Series)

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ABSTRACTS PERTAINING TO COMMUNIST CHINA
IN SOVIET ABSTRACTS JOURNALS

No 44

(Physics Series)
(Mechanics Series)
(Astronomy Series)

This serial publication contains translations of abstracts pertaining to Communist China published in Referativnyy Zhurnal, Fizika (Soviet Abstracts Journal, Physics Series), Nos 5, 6, 7, and 8, 1962; in Referativnyy Zhurnal, Mekhanika (Soviet Abstracts Journal, Mechanics Series), No 11, 1961; and in Referativnyy Zhurnal, Astronomiya (Soviet Abstracts Journal, Astronomy Series), Nos 2, 10, 11, and 12, 1961.

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Abst #5B249 (cont'd)

pass through a 2nd maximum only in the case of Co, Cu and Zn ($\sim 130^\circ$), only a rise is observed in the case of Ni and Cr. The $\sigma_{\text{exp}}(\theta)/\sigma_{\text{Rutherford}}(\theta)$ ratio, over large angles reaches values of ~ 1.2 for Co and Cu, 1.4 for Zn, 1.9 for Ni and 2.4 for Cr.

RZh Fiz, 5-62

HAO Fai-lin
LIU Te-shen
CH'EN Shih-kan

Abst #5C54 Physics/ Physics of Atom
and Molecule, Spectroscopy/
Theory of Molecules and Molecular Spectra

"Energy Spectrum of π -Electrons in Long Chains of
Conjugated Bonds"

Scientia Sinica, 1961, Vol 10, No 6, 653-675

In LCAO MO approximation, extended to an infinite periodic chain, a study is made of the structure of energy spectrum of π -electrons of a number of macro-molecules with a conjugated system of bonds. The secular matrix of the problem includes resonance integrals and overlap integrals of different unit cells. To derive the general characteristics of spectrum regularities the structure of the secular equation is discussed in detail. The evolved theory is applied in the study of the spectrum of poly-nitrile and polymethine chain, and also to chains of the polyphenylene and polyphenylacetylene type. In all of these

Abstr #5014 (cont'd)

where, the secular equation involved and functions $\epsilon(k)$ (k -- wave vector) are omitted. The authors arrive at the following conclusions: 1) the taking into account of the geometry of macro-molecule is important and leads to a close correlation between spectrum and structure; 2) most conjugated chains with hetero-atoms have a spectrum of "semiconductor" type (with a slot); hetero-atoms (and, for example, benzene rings) play an analogous role in the conjugation chain; 3) in the real conjugated systems a spectrum with a slot is the most likely. The authors believe that at present investigations of electron spectra of absorption and of magnetic characteristics of conjugated macro-molecules are more important than the study of their electric conductivity. -- V. Bykroevskiy

RZh. Fiz., 5-62

Abstr #5017 Physics/Optics, Spectral Analysis, Radiation/

BERKOVSKIY A.O.
Zhuk Kac

Photometry and Colorimetry, Sources of Light

"Focusing of Electrons in Cathode System of Photoelectron Multiplier with Semitransparent Cathode"

Na. Ioskhn, I. I. Kirovskaya (Radio Engineering and Electronics)
1971, Vol 7, No 5, 1588-1590

By the simulation method in an electrolytic cell it is proposed to determine the optimal correlations, for a given design of PM, of the different parameters which determine the focusing characteristics of electron optical system of PM with semitransparent cathodes. The method permits a selection of the relationship between these parameters which is best for a given design of the multiplier system. -- Yu. Ivan

КЗН Физ, 5-62

Abst #50277 Physics/ Optics, Spectral Analysis, Acoustics/

VEYNOLKOV M.L.
SIVKOV A.A.
PILN Nang-hue

Photometry and Colorimetry, Sources of Light

"Incandescent Lamp with Radiometric Modulator"

Optika i Spektroskopiya [Optics and Spectroscopy], 1961, Vol 11, No 6, 780-781

Description of an incandescent lamp, a portion of the radiant flux of which is interrupted by a vane, contained within the bulb of the lamp, which is rotated by action of radiometric forces. The twelve blades of the vane, made of Al foil and mica plates, are coated on both sides with carbon black. The lamp contains nitrogen under a pressure of about 0.01 mm Hg. The correlation is shown between frequency of modulation, vane rotation speed, and power supplied to the incandescent tungsten filament. The curve tends to saturation (corresponding to a modulation frequency of about 400 cps), due to friction forces arising in bearings and gas on rotation of the vane. It

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Abst #50277 (cont'd)

is stated that the saturation effect can be achieved at lower rates of speed by increasing gas pressure within the bulb. -- F. Osterberg

RUh Fig, 5-62

Abst #5270 Physics/ High Molecular
Substances and Polymers

LI Piang-t'ung
KATTANOVA A.S.
BAKTYEV N.F.
KOZLOV P.V.

"Study of Spherulitic Structure of Polymers. V. Effect
of the Conditions of Crystallization on Morphology of
Microspherulitic Structures"

Vysokomolekul. Soedineniya [High Molecular Compounds],
1961, Vol 3, No 11, 1734-1738

Poly(ethylene sebacate) was used to study the in-
fluence of the conditions of crystallization of the poly-
mer on morphology of microspherulitic structures. It is
shown that depending on conditions of crystallization,
the same polymer can form two morphological types of
structure, which are detectable with a polarization
microscope, between crossed Nicols. The annular morpho-
logical type is formed on slow crystallization, the radial
type -- on a more rapid crystallization of polymeric

Abst #5270 (cont'd)

substance. For the first time spherulites were obtained
which contain both morphological types: the annular
structure is formed at the middle of the spherulite, and
the radial -- at the periphery. The nature of structural
elements of spherulites of the radial morphological type
was investigated. It was found that these elements are
lamellar crystalline formations connected into flat bands
which determine the fibrillary nature of the structure
of radial-type spherulites. Part IV, see RUh Fig, 1960,
No 10, #383.

RZh Fiz, 5-62

Abst #5254 Physics/ High Molecular
Substances and Polymers

LI Li-sheng
ANDRAYEVA N.S.
KARON V.A.

"Roentgenographic Study of Polyethylene Monocrystals at
Different Temperature"

Vysokomolekul. Soedineniya [High Molecular Compounds],
1971, Vol 3, No 8, 1238-1242

A study was made of monocrystals of polyethylene, obtained from a 0.01% solution in xylene, in the temperature interval from -50 to +135°C. Determinations were made of the coefficient of linear expansion along the a and b axes of the rhombic cell of polyethylene. In the temperature interval of 18.5-115°C the coefficient of linear expansion of b period has the zero value. An evaluation was made of the mean quadratic shift (u^2) of the lattice points of unit cell of polyethylene during thermal vibrations at 18.5° and -17°C, from the (200) and (400) lines. The difference in magnitude of quadratic

Abst #5254 (cont'd)

shift at these temperatures is 0.0% λ^2 . The data obtained coincide with those secured with samples containing amorphous and crystalline regions. -- A. Volkova

RZh Fiz, 5-62

Abst #5869 Physics/ High Molecular
Substances and Polymers

OSSEV S.S.
SUN T'ung
YERMOLLENKO I.N.
ROGOVIN Z.A.

"Investigation of the Structure of Aliphatic Amino Acid
Esters of Cellulose and of Grafted Copolymers of Cellulose
and Polyamides by Infrared Spectroscopy Methods"

~~Vysokomolekul. Soedineniya~~ [High Molecular Compounds],
1961, Vol 3, No 11, 1784-1787

A study was made of infrared absorption spectra of
cellulose esters of aliphatic amino acids (beta-alanine,
epsilon-amino-caproic acid and xi-amino-enanthic acid),
and also of grafted copolymers of cellulose and acetyl-
cellulose with polyamides. The results so obtained confirm
the conclusions, previously arrived at on the basis of
chemical studies, concerning the structure of these new
classes of cellulose derivatives.

RZh Fiz, 5-62

Abst #58100 Physics/ High Molecular
Substances and Polymers

SUN T'ung
OSSEV S.S.
YERMOLLENKO I.N.
ROGOVIN Z.A.

"Investigation of the Structure of Aromatic Amino Acid
Esters of Cellulose and of Grafted Copolymers of Cellulose
and Acrylonitrile by Infrared Spectroscopy Methods"

~~Vysokomolekul. Soedineniya~~ [High Molecular Compounds],
1961, Vol 3, No 11, 1788-1791

A study was made of infrared absorption spectra of
cellulose esters of aromatic amino acids and also of the
grafted copolymer of cellulose and acrylonitrile.

RZh Fiz, 5-72

Abstr #5F316 Physics/ Dielectrics and
Semiconductors

SMOLINSKIY G.A.
CHANG Tsung
JHAR Ye.S.

"Dependence of Initial Permeability of Ferrites with a
Garnet-Type Structure on Frequency and Temperature"

~~Izv. AN SSSR, Ser. Fiz.~~ [Communications of the Academy of
Sciences (USSR, Physics Series)], 14/1, Vol 25, No 11, 1402-
1407

In the frequency region of 10^4 - 10^7 cps a study was
made of complex magnetic permeability $\mu = \mu' - i\mu''$
of polycrystalline samples and monocrystals of yttrium
ferrite-garnet (FG). It was found that in FG of low
specific conductance ρ ($\sim 10^6$ ohm-cm) there is observed
at room temperature a relaxation mechanism of dispersion
of magnetic permeability. On increase of the temperature
maximum μ'' is shifted in the direction of higher
frequencies. In the state of residual magnetization, μ''
decreases considerably in comparison with the absolute-zero

Abstr #5F316 (cont'd)

state. In FG with a high ρ ($\sim 10^{10}$ ohm-cm), which is
achieved by formation of donor-acceptor pairs, on in-
corporation of MnO in the ferrites, and by lowering the
temperature of sintering of the samples, by an addition
of CuO, the maximum of μ'' is shifted to the region of
low frequencies on an elevation of the temperature, i.e.,
a resonance of domain boundaries takes place. The spectra
of such a FG in the state of residual magnetization and
in the absolute-zero state are practically identical.

N. Smol'kov

REN Fiz, 5-62

Abst #57467 Physics/ Kinetics of
Crystallization and
Recrystallization

YIN Shih-tsun
MOSL' A.R.

"Electric Characteristics of Amorphous Tellurium Films
and the Influence of Admixtures on Conditions of Their
Crystallization"

~~Fiz. Tsvetkov Tala~~ [Physics of Solids], 1961, Vol 3,
No 12, 3414-3420

By making use of the sharp change in resistance on
a transition from amorphous to crystalline state, it is
shown that the temperature of rapid crystallization of
amorphous films of Te with an admixture of 0.1 at.% Se
remains the same as that of pure Te, while in the case
of an admixture of 0.5 at.% I it is lowered 10° . From
data of electric conductance of amorphous films of pure
Te, and of thermo-emf, measured in the interval from
 -150° to 0°C , were calculated the concentration of
holes, of $\sim 10^{17}\text{ cm}^{-3}$, and their mobility of
 $10^{11}\text{ cm}^2\text{ v}^{-1}\text{ sec}^{-1}$.

REN Fiz, 5-62

Abst #57492 Physics/ Metals

GALKINA O.S.
CHERNIKOVA L.A.
CHANG K'ai-ta
KONDORSKIY Ye.I.

"Electric Characteristics of Thin Films of Nickel at Low
Temperatures"

~~Zh. Eksp. i Teor. Fiz.~~ [Journal of Experimental and
Theoretical Physics], 1961, Vol 41, No 6, 1763-1766

A study was made of the electric characteristics of
thin films of Ni of a very high degree of purity, made by
the method of thermal vaporization in vacuum, in a bulb
maintained in a helium bath during the film-formation
by atomization. Films having a thickness from 30 \AA and
were had a residual specific electric resistance and
Hall emf of an order of magnitude close to those observed
for massive samples of Ni.

RZh Fiz, 5-62

Abst #50167 Physics/Radiophysics

WANG Huan-cho

"Calculation of Matching Metal Insert in a Waveguide of Circular Cross Section"

Radiotekhn. i Elektronika [Radio Engineering and Electronics] 1961, Vol 6, No 7, 1208-1209

A method is proposed for calculation of a metal rod of varying radius, inserted in the tapered intermediate portion between two waveguides of circular cross section and common axis, for the purpose of decreasing the amplitude of H_{02} wave arising when an H_{01} wave is incident to the intermediate portion. A numerical example is given.

.....

RZh Fiz, 5-62

Abst #50275 Physics/Radiophysics

CH'ING Jung-hao

"Radio-Observations of Diffuse Nebulas Omega (NGC 6618), Laguna (NGC 6523) and Trifid (NGC 6514) in the Decimeter Range"

Astron. Zh. [Astronomical Journal], 1961, Vol 38, No 6, 1069-1073

Results of observations of diffuse nebulas NGC 6618, NGC 6523 and NGC 6514, at frequencies of 1320 and 1500 mc. Radiospectra, dependency of brightness temperature on wavelength, and models, have been derived for these nebulas; optical-range absorption by interstellar dust was determined, and excitations of diffuse nebulas by hot stars are considered.

RZh Fizika 6-62

Abst #62236

Physics/
Nuclear Physics, Plasma
Physics/ Elementary
Particles

BARASHENKOV, V.S.
BLOKHINTSEV, D.I.
WANG Jung
MIKHUL, E.K.
HUANG Tsu-ehau
HU Shih-k'o

"Inelastic Pion-Nucleonic Interactions at High Energies"

~~Zh. eksperiment. i teoret. fiz.~~ (Journal of Experimental and Theoretical Physics), 1962, 42, No 1, 217-223

Peripheral interactions of π -mesons with nucleons are examined in a single-meson approximation. The comparison with experiment of the calculated values of multiplicity of particles produced, angular and energetic distributions of recoil nucleon and its transverse momentum, indicates that at high energies πN -collisions due to $\pi\pi$ -interaction predominate.

RZh Fizika 6-62

Abst #60350

Physics/Physics of
Atom and Molecule.
Spectroscopy/Nuclear
Quadrupole Resonance

MALYUCHKOV, O.T.
FINKEL'SHTEYN, B.N.
OH'IK I-jang

"Influence of Silver Admixture Upon Nuclear Quadrupole Resonance of Cu^{63} in Cuprous Oxide"

~~Fiz. tverdogo tela~~ (Physics of Solid Body), 1961, 3, No 11, pp 3534-3535

In a pure cuprous oxide (I) the width of the line of nuclear quadrupole resonance is equal to 16 ke and the 2nd moment $\langle \Delta\nu^2 \rangle = 15.6$ ke. With the increase of the concentration of Ag admixture in I the amplitude of the signal (A) decreases and $\langle \Delta\nu^2 \rangle$ increases. It was shown that one Ag atom brings out of resonance 400 adjoining Cu^{63} atoms. The introduction of about 0.4% Ag into the lattice of I decreases A by about 6 times.
-- N.Fedin.

RIN Fisika 6-62

#60375

Physics/
Physical Basis of
Electronics

OHIN Tung-hai
NAKANURA Fukuro

"Mechanism of Reignition and Quenching of High-Frequency
Arcs"

J. Inst. Electr. Eng. Japan, 1961, 81, No 10, pp 1660-1660

[No abstract]

RZh Fizika 7-62 Abst #7A281

Physics/
Theoretical Physics

WANG Jung
HU Shih-k'io

"A Possible Model of Production of the Λ -Particle in a High-Energy Pion-Nucleon Collision"

~~Zh. eksperimental'noi i teoreticheskoi fiziki~~ (Journal of Experimental and Theoretical Physics), 1961, No 6, pp 1868-1869

On the basis of the model of Λ -particle production in high-energy pion-nucleon collisions suggested by D. Blokhintsev and Wang Jung (RZh Fizika, 1961, 10A242), the following results were obtained: 1) mean-square transverse impulse of Λ -particle depends little on the energy of the incident π -meson and is equal to ~ 400 Mev/c; 2) in the O-system Λ -particles impinge mainly backwards; 3) in the L-system the degree of longitudinal polarization of the Λ -particle is $\pm v/c$, where v is velocity of Λ -

Abst #7A281 (cont'd)

particle. Deductions 1) and 2) agree with experimental data.-- L. Blokhintsev.

KRASNOVSKY A.A.
YEROKHIN Yu.Ye.
HUNG YU-oh'iun

"Fluorescence of Aggregated Forms of Bacteriochlorophyll, Bacterioviridin and Chlorophyll in Connection with the State of Pigments in Photosynthesizing Organisms"

DOKL. AN SSSR (Reports of the Academy of Sciences USSR),
1962, 143, No 2, pp 456-459

A comparative investigation of luminescence (L) of artificial aggregated forms of chlorophyll (Ch), bacteriochlorophyll (BCh), bacterioviridin (BV) and protochlorophyll, and their L in vivo, was carried out. All investigated pigments possessed characteristic long-wave L, which, in the opinion of authors, is due to aggregated forms, in contrast to usual fluorescence due to "monomeric" forms of pigments. Thus, at +20° in the region of

Abst #7E182 (cont'd)

850-890 mμ there was detected a weak L of densely packed (after prolonged evacuation) films of BCh. Freezing to -196° led to a considerable increase of the intensity of this L and a shift of the maximum to 910-920 mμ. Adsorbates of BCh on sucrose at +20° revealed a weak L at 810 and 880 mμ. Upon their freezing to -196° there was observed an increase of the intensity and a shift of the maximum of L to 820 and 915 mμ, respectively. Colloidal solutions of BCh had maxima of L in the region of 800 mμ at +20° and in the region of 810-815 mμ at -196°. The films of BCh after prolonged evacuation gave a weak L at ~780-790 mμ at +20° and rather intensive L (805-810 mμ) at -196°. Colloidal solutions of BV and its adsorbates on sucrose fluoresced in the region of 780-790 mμ at +20° and at -196° in the region of 780-800 mμ. Hard films of chlorophyll-a had a characteristic maximum of L at -196° for 740-750 mμ. In some cases (with incomplete evacuation of solvent) it was possible to obtain spectra of

Abst #70182 (cont'd)

Oh and BOh having a set of monomeric and aggregated M very close to the spectra of L of leaves or live bacteria. But in model systems it was not possible to obtain the maximum 810-815 mμ which is present in the spectrum of leaves of green plants, and 805-820 mμ, characteristic of spectra of green bacteria. -- G.Rikhireva.

RZh Fizika 7-62

Abst #7316

Physics/
Radiophysics/
Theory of Oscilla-
tions

LEBENDEV, I.V.
OH'EN Chung-mou

"On Possibilities of the Use of Superhigh-Frequency Autogenerators as Feedback Amplifiers. I. Amplifiers Working as Two-Terminal Networks"

Izv. Vyssh. uchebn. zavedeniy. Radiotekhnika (News of Higher Educational Institutions. Radio Engineering), 1961, 4, No 5, pp 560-567

The possibilities of feedback amplification with underexcited superhigh-frequency autogenerators connected as feedback amplifiers (with circulators) are discussed. Amplification factors and frequency bandwidths were calculated. The effected calculations show that, taking into account the practical existence of a mismatch, the amplification factor is limited by a value of the order of

Abst #7016 (cont'd)

20-30 db (VSWR ≤ 1.2). Whereupon, the bandwidth of such an amplifier may constitute several percent. To widen the pass-band, it is necessary to select such a design and such operating conditions of the device that the ratio of electron conductivity to the conductivity of the oscillatory circuit be as great as possible. The assurance of a stable amplification range is achieved through the increase of amplifier-load coupling. It is pointed out that the calculations quoted in the article may also be used both for the creation of feedback amplifiers as well as for "hot" measurements in the investigation of the properties of electronic and semiconductor superhigh-frequency autogenerators.--A.Pirogov.

RZh Fizika 7-62

Abst #7-3-50d

Physics/
Electron Tubes

LEBEDEV, L.V.
CH'EN Chung-mou

"On Possibilities of the Use of Superhigh-Frequency Autogenerators as Feedback Amplifiers. I. Amplifiers Working as Two-Terminal Networks"

~~Izv. vyzsh. uchebn. zavedeniy. Radiotekhnika (News of Higher Educational Institutions. Radio Engineering), 1961, 4, No 5, pp 560-567~~

The calculation formulas of amplification factors and service-frequency bands for a negative conductance feedback amplifier (FA) having one coupling element of the resonance oscillatory system with load are given. The possibilities of obtaining an amplification of 20-30 db at a bandwidth of several percent were examined. The influence upon the value of amplification factor of the possible mismatch

Abst #7-3-50d (cont'd)

at the input of the circulator, situated between FA and load, which isolates the input and output signals, was taken into consideration. The basic deduction from the obtained results is the necessity of preserving in the regime of disrupted oscillations a large value of active negative electron conductance inherent in superhigh-frequency autogenerators. Therefore, the underexcited operating conditions should be ensured not by a decrease of electron current but by an increase of the input load, i.e., by an increase of the relation of inherent Q to the external Q . While designing FA it is necessary to strive to decrease wave conductance of the oscillatory system of the autogenerator on the basis of which FA is created. Bibl. 8 titles.

NZh Fizika 8-62

Abst #8E118

Physics/
Dielectric and
Semiconductor
Polymers

MIKHAYLOV, N.V.
PAYNEBERG, E.Z.
GORBACHEVA, V.O.
CH'ENG Ch'ing-hai

"On the Compatibility of Polyethylene-Polypropylene System"

Vysokomolekul. sovedineniya (High-Molecular Compounds),
1962, 4, No 2, pp 237-241

The compatibility of mixtures of polyethylene (PE) and polypropylene (PP) prepared with the same solvent at 160-165°C and through fusion was studied. To investigate the properties of these mixtures, a differential thermal analysis, thermochemical method and method of gradient tube for measuring density were used. For comparison, copolymer data are quoted. According to data of thermal capacity and

Abat #82118 (cont'd)

density, the highest deviations from additiveness are observed in a combined mixture of polymers of 7.5:2.5 composition; in this case, their most complete compatibility is assumed. Upon transition to incompatible mixtures, the difference between their real density and that which would be in the case of additivity changes sign, which proves the existence of a concentrational limit of compatibility. From the quoted data, it is seen that the compatibility is observed at high PE concentrations ($\leq 75\%$). A mixture containing almost pure PP (2:98) divides into layers. Compatibility is connected with the plasticizing effect of PE on PP due to different flexibility of molecular chains of polymers.--I.Musayelyan.

RZh Fizika 8-62

Abat #87265

Physics /
Dielectrics and
Semiconductors /
Ferromagnetic
Resonance

HSU Yen-sheng

"Spectrum of Short Spin Waves in a Ferrite Core and Sphere"

Radiotekhn. i elektronika (Radio Engineering and Electronics),
1962, 7, No 2, pp 321-327

The spectrum of spin waves in a ferrite cylinder and sphere was examined in a magnetostatic approximation. The expressions for magnetostatic oscillations at sufficiently small wavelengths (of much smaller dimensions than the sample) were obtained. The effects upon the spin-wave spectrum of the dimensions and form of the ferrite sample were analyzed.--N.Potapkov.

HSU Yen-sheng

"On the Theory of Resonance Ferrite Systems"

Radiotekhn. i elektronika (Radio Engineering and Electronics), 1962, 7, No 3, pp 429-436

Calculations are given for the design of a high-power resonance ferrite rectifier composed of thick ferrite plates partially filling the space between the wide waveguide walls. The solution is arrived at by the method of successive approximations. In the case when the dimensions of the core are large and the magnetic field is parallel to the waveguide walls, different resonance conditions exist for the forward and backward wave. The conditions were derived for round and elliptic cross section of ferrite cores in a rectangular waveguide, taking into account the influence of the walls by the method of mirror

L

J

Abst #80156 (cont'd)

reflections. It is noted that, to build rectifiers, it is expedient to use plates with approximately rectangular cross section. In this case the theoretical evaluation of the difference of resonance fields becomes understated.
--G. Postnov.

L

J

OH'IN Jung-hao

"Observation of the Source Sagittarius A at a Frequency of
1500 McAstron. zh. (Astronomical Journal), 1962, 39, No 1, pp 166-
168

On the basis of data on the radioemission of the
source Sagittarius A at 1500 Mc ($F_{\nu} = 1260 \cdot 10^{-26}$ wntt/m² cps,
 $\varphi = 0^{\circ}.37$) obtained by the author, a model was constructed.
The evaluation of the star numbers of various spectral
classes necessary for the excitation of the source are
given.

CHANG Jen-wei

"Stability of One Nonlinear Regulated System"

~~Avtomatika i telemekhanika~~ (Automation and Telemechanics),
1960, 21, No 11, pp 1475-1480

The problem of the stability of the following regulation system is being considered

$$T\ddot{\psi} + U\dot{\psi} + K(\psi) + \mu = 0, \quad \dot{\psi} - \beta - \mu = 0$$

$$\mu = f(\sigma), \quad \dot{\sigma} = a\psi + b\dot{\psi} + c\ddot{\psi} - \frac{1}{T}\mu$$

where T, U, n, a, b, c, l are constant, and $K(\psi) = a\psi + \mu\psi^2, \mu(\sigma) > 0$.

The conditions of stability were realized by a known method as the conditions of sign-fixedness of the derivative function

$$V = \frac{1}{T} \sum_{i=1}^n a_i w_i + \frac{1}{T} \sigma$$

Abst #11A126 (cont'd)

where

$$\eta_1 = \psi, \quad \eta_2 = T\dot{\psi}, \quad \eta_3 = \sigma, \quad \sum_{i=1}^3 a_i w_i$$

is Lyapunov's function for a linearized system of equations. The conditions of stability were satisfied in the form of two inequalities containing the variable η_1 and are valid if $|\eta_1| < \bar{\eta}_1$.

~~Abstract's note:~~ The affirmation of the author that upon fulfillment of the conditions obtained by him the system is stable asymptotically at $|\psi| < \bar{\psi}$ and at all kinds of perturbations of η_1, η_2 and σ , is erroneous. The correct evaluation of the field of attraction is given by the inequality $V(\eta_1, \eta_2, \eta_3, \sigma) < \epsilon$ at $|\eta_1| = \bar{\eta}_1$. -- B. Rasumikhin.

RZh Mekhanika 11-61

Abat #118747

Mechanics /
Hydromechanics /
Dynamic Meteorology

TSENG CH'ing-ta'ung

"Application of a Complete System of Equations of Thermo-hydrodynamics to Short-Term Weather Prognosis in a Two-Level Model"

Dokl. Ak. Nauk (Reports of the Academy of Sciences USSR), 1961, 137, No 1, pp 76-78

Basic are two equations of motion and an equation of continuity and heat influx in which temperature is eliminated by means of equations of state and of Clapeyron,

$$\frac{du}{dt} + \frac{dv}{dt} + w = - \left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} \right)$$

$$\frac{du}{dt} + \frac{dv}{dt} + w = - \left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} \right)$$

Abat #118747 (cont'd)

$$\frac{du}{dt} + \frac{dv}{dt} + \frac{dw}{dt} = 0$$

$$\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} \right) = - \left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} \right)$$

with limiting conditions $w = 0$ with $\xi = 0$ and 1; here, x, y, ξ are spatial coordinates, where $\xi = \gamma/P$ is the reduced pressure (P is pressure at sea level); t is time; u, v, w are corresponding velocities; Φ is geopotential; f is a Coriolis parameter; $\sigma^2 = (R^2 T_1 / g)(\gamma_a - \gamma)$, where R is the gas constant, T_1 - mean temperature, g - earth's gravitational force, γ_a - dry adiabatic gradient, γ - vertical gradient of temperature (assumed, as usual, $\sigma^2 = \text{const}$). The functions u, v, Φ are found on isobaric surfaces of 250 and 750 mbars and with a view to this the first three equations are recorded at these levels and the last one at the 500 mbars level. Derivatives of ξ and t are replaced by centered divided differences. Nonlinear terms of equations as well as terms connected with ξ are considered in each

Abst #11B747 (cont'd)

case as known (equal to their value at the end of the previous step in time). Thus, for the six functions

$$U = \frac{1}{2}(u_{200} + u_{100}), \quad V = \frac{1}{2}(v_{200} + v_{100}),$$

$$N = \frac{1}{2}(n_{200} + n_{100})$$

$$u = \frac{1}{2}(u_{200} - u_{100}), \quad v = \frac{1}{2}(v_{200} - v_{100}),$$

$$n = \frac{1}{2}(n_{200} - n_{100})$$

we have obtained six prognostic equations, two of which (for u and v) represent final relations, one of them is the Helmholtz equation, and the other three are Poisson's equations. The time step ends by finding $w_{200} = -(u_{200} + v_{200})$. The scheme was realized by the author using the BESM-2 machine, whereupon as steps for t and x , y were taken $\delta t = 30$ min and $\delta s = 300$ km.-- V. Fadyshnikov.

MZh Mekhanika 11-61

Abst #11B671

Mechanics/
Hydromechanics

RYZHIK, V.M.
CHARNYY, I.A.
CH'EN Chung-hsiang

"On Certain Exact Solutions of Equations of Nonstationary Filtration of Two-Phase Liquid"

Izv. AN SSSR, Otd. tekhn. n. Mekhan. i mashinost. (News of the Academy of Sciences USSR, Section of Technical Sciences, Mechanics and Machine Building), 1961, No 1, pp 121-126

An exact solution of the form $\rho(x - Vt)$ of the equation of nonstationary filtration of a two-phase liquid, taking into account capillary and gravitational forces, for the case $q = \text{const}$ is given. Here, ρ is saturation of a porous space by a displacing phase, x is the coordinate in the direction of motion, V is constant velocity of propagation of saturation, t is time, q is the velocity of fil-

Abst #115871 (cont'd)

tration of the mixture. To determine the constant of integration, it is assumed as boundary conditions that $p \rightarrow p_1$ at $z \rightarrow -\infty$ and $p \rightarrow p_2$ at $z \rightarrow \infty$. The subscripts 1 and 2 relate, respectively, to the displacing phase and that being displaced. Furthermore, the case is investigated when the displacing phase is formed by a pure liquid. In conclusion, some examples are given of the calculation of the stabilized zone in the case of displacement of water by air and petroleum by water from a hydrophilic porous medium. The results of calculations are given in the form of graphs. Bibl. 6 titles.-- M. Filinev.

RZh Mekhanika 11-61

Abst #11061

Mechanics /
Theory of Elasticity

PI Chen-tung
LIU Chia-kan
HE Kuang-kan
TUNG Shih-lin

"The Theory of Elasticity of Sloping Shells of Double Curvature"

ENGIN. CONSTR., 1958, No 7, pp 15-31, 55

[No abstract]

RZh Mekhanika 11-61

Abst #110246

Mechanics /
Plasticity, Creep,
Soil Mechanics

TU Ch'ing-hua

"Elastoplastic stressed State in Rotating Disks at High Temperatures"

J. Tsinghua Univ., 1959, 6, No 5, pp 81-96

The known methods of design of nonuniformly heated rotating disks of variable cross section, taking into account the change of elastic and plastic characteristics along with change of temperature, are explained. The method is based on division of the disk into rings and averaging of temperature according to rings. Bibl. 28 titles.-- S. Shesterikov.

RZh Mekhanika 11-61

Abst #110347

Mechanics /
Strength of
Structures

LIAO Hung-en
CH'EN Hua-li

"Calculation of Stresses in Gravitational Dams by the Net-Point Method"

J. Tsinghua Univ., 1959, 6, No 5, pp 143-154

The results of work showed that the net-point method is especially useful for gravitational loads and designs with variable moduli of elasticity. A detailed description is given of the method of testing materials of models (including measurement of the modulus of elasticity, Poisson's coefficient and creep characteristics) as well as a method of preparation of models.-- From authors' summary.

Acta Mechanica 11-61

Abstr #110380

Mechanics/
Elasticity and
Plasticity

HSIUNG Chien-kuo
LAN Kuei-lu
WU Wan-hsin

"Investigation of Limiting Strength of the Cross Section
of Previously Stressed and Normal Reinforced Concrete
Elements Subjected to Bending"

Scientia sinica, 1960, 9, No 5, pp 695-718

See Chinese J. Civil Engng. 1959, 6, No 3,
pp 169-187.

[No abstract]

RZh Astronomiya 2-61 Abst #2D102 Astronomy/ Engineering
Geodesy

LI Ch'ing-hai

"The Error Ellipse of Forward Intersection and the Probability of Longitudinal and Transverse Errors"

Acta geod. et cartogr. sinica, 1959, Vol 3, No 2, pp 116-125

On the basis of the book by Lutz "The Breaking Up of Large Structures", the application of the error ellipse in the case of breaking up of engineering structures by forward intersection was examined. The probability of longitudinal and transverse errors computed according to Lutz's formulas was found to be equal to 0.63. It is noted that it is desirable to construct the error ellipse with a probability of 0.95. To study the case of multiple intersection, it is suggested to reduce it to a single intersection while maintaining the parameters of the error ellipse.

RZh Astronomiya 2-61 Abst #2D103 Astronomy/ Engineering
Geodesy

"Creation of a Reference Network for Surveying the Region of the Approach Tunnel of the Liu-chia-hsia Hydroelectric Station"

Huanghe jianzhu, 1960, No 2, pp 33-34

[No abstract]

RZh Astronomiya 10-61

Abst #10A126

Astronomy/ Photo-
graphic Astrometry/
Individual Astro-
metric Observations

KAMAYEV, I.I.
WAN Lai

"Results of Investigation of KIM-3 Device No 550002"

~~IZV. Ob. Astron. obsery. v Pulkovo (News of the Main
Astronomical Observatory in Pulkovo), 1960, Vol 22,
No 1, pp 180-183~~

The results of investigation of divided scales, guide-rules and spiral micrometers of the KIM-3 device No 550002 are given. The authors effected independent determinations of corrections relative to 240 divisions (out of 300) of each of two scales. The comparative square error in this reading of convergence results from two measurers are $\pm 0.15 \mu$ and $\pm 0.22 \mu$, respectively, for x and y scales. The divisions were found to be dis-

Abst #10A126 (cont'd)

tributed very uniformly but the ranges of scales lacked correspondence, which necessitated important corrections of the x scale at extreme divisions ($\sim 3 \mu$). Guide-rules of the scale of the device proved to be of high quality (corrections ranged from $+0.7 \mu$ to -1.0μ); periodic errors of spiral micrometers ranged from -0.8μ to $+0.9 \mu$. An important shortcoming of the device is the presence of a considerable "run" in the micrometer (for $+2.5 \mu$ mm). The angle between guide lines was found to be $90^\circ + 22''$, $\delta \pm 4''$.7. The investigation showed that KIM-3 No 550002 is suitable for precision astrophotographic work provided the above-indicated corrections are effected. - A.Nemiro

RZh Astronomiya 11-61 Abst #11A105 Astronomy/ Astrometry

YEH Shu-hua
HSIAO Pao-sh'in

"Note on a Sudden Change of the Earth's Rotation"

Acta Astron. Sinica, 1960, Vol 8, No 1, pp 68-69

According to the time services of observatories of Purple Mountain and Zi-k'a-wei, with adjunction to the group of four quartz clocks of the Zi-k'a-wei observatory there was noted a sudden change in the velocity of the earth's rotation. This change occurred in the second half of July 1959. The duration of the day decreased by ~ 0.8 msec.- Author's summary

KSI Tse-taung

"Some Problems Concerning the History of Astronomy in China"

Chinese J. History Sci., 1960, No 3, pp 53-58

The slow growth of productional forces during millenia of the slave-owning and feudal system in China hampered the development of science, including astronomy. The practical role of astronomy in ancient and medieval China was mostly manifested in the compiling of the calendar. The calendar used was the lunar-solar one in which the alternation of "short" and "long" lunar months and periodical intercalation of a 13th month permitted the coordination of cycles of months with the solar year. In order to render the calendar and chronology more accurate, advance calculations and observations of solar and lunar eclipses were effected. Thus, during the Han dynasty (206 B.C.-A.D.220), 29 solar eclipses were recorded and

Abst #12A4 (cont'd)

during the Sun dynasty (960-1279), 145 solar eclipses were noted. The individual periods of rapid development of astronomy in China occurred during economical upsurges of the country. This happened in the age of "warring kingdoms" (5th-3rd century B.C.), during the Han dynasty and considerably later during the Sun and Yuan dynasties. From the 14th century on, an economical and cultural stagnation began in China, which coincided with the beginning of a rapid economical and cultural development in Europe.

The world outlook of prominent Chinese astronomers reflected advanced philosophical and political ideas for their time. Thus, Ch'ang-Hong (76-135) professed progressive cosmological ideas (he affirmed the infinity of the universe). A striking example of the progressive thought at that time was the theory of a celestial sphere surrounding the earth (also spherical) on all sides. At present, in the new, people's China, the possibilities for the development of astronomy are limitless.- Yu.Pere1'

REN, *Astronomiya* 12-61 Abst #12A659 Astronomy/Cosmogony
and Cosmology

TAI Wen-sai

"Distribution of Angular Momentum in the Solar System"

Acta astron. sinica, 1960, Vol 8, No 1, pp 1-18

The detailed calculations of angular momenta of the quantity of motion of various bodies in the solar system intended for use in cosmogonical investigation are given. The orbital and axial momenta of planets (for various models of internal structure), orbital and axial momenta of satellites (it is assumed that the periods of revolution of satellites are equal to the periods of rotation), orbital momenta of the four largest asteroids and orbital momentum of the sun (for various models of its internal structure) are provided. The calculations of the position of the Laplace plane of the solar system and inclinations towards it of the planes of planetary orbits are supplied. Full momentum of the quantity of motion of

Abst # 12A659 (cont'd)

the solar system is compared with orbital momenta of a number of visually-double stars and angular momenta of A and B class first-magnitude stars. Full and specific momenta of central bodies and satellites are compared, as well as certain conclusions are drawn concerning the distribution of density and thickness of the protoplanetary cloud at different distances from the sun. Bibl. 12 titles.- From author's summary

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