MALKIN, [illegible]

[illegible] to measure the wear of the cutting edge of a die and the [illegible] of burrs on parts being cut. Kuz.-shtam. proizv. no.8:45-[illegible]. (MIRA 18:9)

ISAKOV, Petr Kuz'mich, kand.biolog.nauk; MALKIN, B.V., nauchnyy red.; NOVOCHADOVA, L.A., red.izd-va; SAVCHENKO, Ye.V., tekhn.red.

[Problems of space flights] Problemy poletov v kosmos. Moskva, Izd-vo "Znanie," 1958. 31 p. (MIRA 12:3)
(Space flight) (Rockets (Aeronautics))

MAIKIN, Ber Veniaminovich; VOROB'YEV, Anatoliy Alekseyevich; SOSYANTS, V.G., red.; CHERRYZHOV, V.A., red.izd-va; KHENOKH, F.M., tekhn. red.

[Thermit welding] Termitnaia svarka. Moskva, Izd-vo MKh RSFSR, 1963. 103 p. (MIRA 16:8)
(Thermit welding)

MALKIN, B.Z.

Calculating the probabilities of radiationless transitions for the Cr^{+3} ion in ruby. Fiz. tver. tela 4 no.8:2214-2222 Ag '62. (MIRA 15:11)

1. Kazanskiy gosudarstvennyy universitet imeni V.I. Ul'yanova-Lenina.
(Chromium) (Masers) (Quantum theory)

Malkin, B. Z.

AID Nr. 972-4 21 May

NONRADIATIVE TRANSITION PROBABILITY OF Sm^{2+} ION IN FLUORITE (USSR)

Malkin, B. Z. Fizika tverdogo tela, v. 5, no. 4, Apr 1963, 1062-1066.
S/181/63/005/004/013/047

The probability of the nonradiative two-phonon transition $^7F_1 \rightarrow {}^7F_0$ of Sm^{2+} in the center of a cubic cell of F^- ions in the fluorite lattice has been calculated. From the probability of this transition, which takes place during the operation of a four-level laser using a $CaF_2:Sm^{2+}$ crystal, the rate of transition of ions to the ground state after stimulated emission of a photon with an energy of 14,118 cm^{-1} can be ascertained. The calculated value of $W(^7F_1 \rightarrow {}^7F_0)$ is $2.2 \cdot 10^{10}$ sec^{-1} at 0°K and increases with increased temperature. This confirms the assumption of W. Kaiser *et al.* that there is no accumulation of Sm^{2+} ions at the $^7F_1$ level during the operation of the $CaF_2:Sm^{2+}$ laser. The calculation will allow a more precise rendering of equations describing the operation of this laser. [BB]

Card 1/1

37891
S/056/62/042/005/042/050
B108/B138

24.6111

AUTHOR: Malkin, B. Z.

TITLE: Theory of radiationless transitions in luminescent ionic crystals

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 5, 1962, 1410 - 1411

TEXT: Radiationless transitions between the energy levels of the active impurity ions occur in lasers and irasers. It is assumed that radiationless transitions are caused by the variable Coulomb fields of the nearest neighbor ions. An interaction Hamiltonian (impurity ion - lattice vibrations) of the form $H = \sum_{\alpha} V_{\alpha} Q_{\alpha}$ was used for the calculations. V_{α} are functions of the coordinates of the electrons in the unfilled shell. The Q_{α} account for the potential energy of the impurity ion in the crystal electric field. In this Hamiltonian only symmetrical oscillations transforming according to the even representations Γ_{3g} and Γ_{5g} have to be taken into account. Experimental and theoretical results concerning the

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Theory of radiationless.... S/056/62/042/005/042/050
B108/B138

probability of radiationless transition differ by about one order of magnitude.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet (Kazan' State University)

SUBMITTED: February 12, 1962

Card 2/2

MALKIN, B.Z.

Calculation of the probability of nonradiative transition for the Sm^{2+} ion in fluorite. Fiz.tver.tela 5 no.4:1062-1066 Ap '63. (MIRA 16:4)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.

(Fluorite) (Samarium)

MALKIN, B.Z.

Theory of the shape, width, and shifting of luminescence lines of impurity centers in ionic crystals. Fiz. tver. tela 5 no.11: 3088-3094 N '63. (MIRA 16:12)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.

L 00569-66 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5016558 UR/0056/65/048/006/1637/1645

AUTHOR: Malkin, B. Z. 44,55

TITLE: Contribution to the theory of the vibrational structure of the optical spectra of paramagnetic crystals 21,44,55

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 6, 1965, 1637-1645

TOPIC TAGS: crystal lattice vibration, optic spectrum, spectrum analysis, optic transition, paramagnetic absorption

ABSTRACT: The author considers single-phonon electron-vibrational transitions in ionic crystals containing impurity ions of transition-group elements. Particular attention is paid to the question of the appearance of quasilocal and local vibrations in the vibrational structure of the optical luminescence and absorption spectra of paramagnetic crystals which contain ions of the iron and rare-earth

Card 1/3

ACCESSION NR: AP5016558

3

groups as impurities. The interaction of the impurity ion with the crystal lattice is treated in the harmonic approximation. Only the part due to single-phonon transitions in the electron-vibrational band is considered. The intensity of the electron-vibrational band is calculated by second-order perturbation theory. The vibrational structure of the luminescence spectrum of the $CaF_2:Tu^{2+}$ crystal is calculated theoretically. Comparison with experiment confirms the presence of a vibrational structure in the lines due to the quasi-local vibrations. The possibility of studying the dynamics of a crystal containing impurities by means of optical spectroscopy is discussed. It is concluded that the investigation of the vibrational structure opens up the possibility of studying not only the motion of the impurity atom itself, as in the Mossbauer effect, but also the vibrations of its immediate surroundings, which modulate the Stark splitting of the energy levels in the crystalline field. "The author thanks Professor S. A. Al'tshuler for his interest in the work, valuable advice, and a discussion of the results." Orig. art.

L 00569-66

ACCESSION NR: AP5016558

has: 2 figures, 27 formulas, and 2 tables.

SUBMITTED: 09Dec64 ENCL: 00 SUB CODE: OP

NR REF SOV: 001 OTHER: 012

Card 3/3

ACC NR: AP6033572 SOURCE CODE: UR/0181/66/008/010/3070/3074

AUTHOR: Gil'fanov, F. Z.; Malkin, B. Z.; Nasyrov, I. K.; Stolov, A. L.

ORG: Kazan' State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: Temperature dependence of the widths and shifts of phononless absorption lines in crystals of fluorides activated with gadolinium

SOURCE: Fizika tverdogo tela, v. 8, no. 10, 1966, 3070-3074

TOPIC TAGS: absorption line, line shift, line width, activated crystal, fluoride, temperature dependence, Stark effect, optic transition

ABSTRACT: The authors investigated the widths and shifts of the absorption lines of Gd^{3+} in CdF_2, CaF_2, SrF_2, and BaF_2 crystals, corresponding to phononless transitions to Stark sublevels of the terms $^6P_{5/2}$ and $^6P_{7/2}$ from the ground state $^8S_{7/2}$, as functions of the concentration and temperature. Use was made of the energy levels of Gd^{3+} in these crystals, corresponding to different symmetry centers, published by the authors earlier (Opt. spektr. v. 20, 99, 1966; FTT v. 8, 142, 1966). The Gd content was 0.1, 0.3, and 1.0 at.%. The absorption spectra were obtained with a diffraction spectrograph (DFS-8-1). The crystals were grown by crystallization from the melt. The measurements were made in the interval 78--300K. All line widths increase with

ACC NR: AP6033572

increasing temperature in nearly linear fashion. The maximum width range from 2 to 6 cm^{-1} at nitrogen and room temperatures, respectively. Line shifts occur with increasing temperature, amounting to 1--4 cm^{-1}, at all wavelengths. The line width is proportional to the Gd concentration. The widths and shifts increase with lowering of the crystal symmetry. The basic metal does not affect the results much. A formula is derived for the temperature dependence of the widths and shifts of cubic centers in metallic fluoride and is found to explain the observed experimental data. Orig. art. has: 3 figures and 5 formulas.

SUB CODE: 20/ SUBM DATE: 15Dec65/ ORIG REF: 003/ OTH REF: 005

Card 2/2

L 07426-67 EWT(m)/EWP(t)/ETI IJP(c) JD
ACC NR: AR6027561 SOURCE CODE: UR/0272/66/000/005/0067/0067

29
B

AUTHOR: Malkin, D. D.; Sizov, A. P.

TITLE: Vibroelectrolytic polishing of small components

SOURCE: Ref. zh. Metrologiya i izmeritel'naya tekhnika, Abs. 5.32.482

REF SOURCE: Chasy, chas. mekhanizmy, vyp 3(150), 165, 14-16

TOPIC TAGS: metal polishing, electrolyte, electrochemistry

ABSTRACT: The authors describe a method for vibroelectrolytic polishing of small components developed at the Scientific Research Institute of the Watchmaking Industry. The components are placed in a metal tank containing the electrolyte. The tank is connected to the anode, and the cathode is introduced into the tank through a central opening in the lid. The tank is placed on a vibrator table. Oscillation of the tank during treatment causes motion of the randomly distributed components along a complex spatial trajectory with periodic tossing. The parts being treated make period contact with the inner surface of the tank either directly or through other components. Thus the entire batch of components is subjected to thorough and uniform electrolytic polishing. Anode current density is 5-10 a/dm^2. 1 illustration, bibliography of 4 titles. [Translation of abstract]

SUB CODE: 13, 11

Card 1/1 UDC: 681.112.002.2

L 07425-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AR6027562 SOURCE CODE: UR/0272/66/000/005/0067/0067

34
B

AUTHOR: Malkin, D. D.; Stogova, Ye. N.; Konoplyannikov, Yu. A.

TITLE: Selection of electrolytes for liquid vibration treatment

SOURCE: Ref. zh. Metrologiya i izmeritel'naya tekhnika, Abs. 5.32.483

REF SOURCE: Chasy, chas. mekhanizmy, vyp. 3(150), 1965, 11-13

TOPIC TAGS: metal polishing, electrolyte, mechanical vibration

ABSTRACT: An advantage of the liquid vibration method of treatment lies in the selective action of the working fluid: complete elimination of burrs with dimensions of several hundredths of a millimeter involves a removal with respect to contour of a few microns with an accuracy of 2-3 μ. This method may be used for treating easily deformed components made of all types of metallic materials used in the watchmaking industry. A batch of several thousand components may be treated simultaneously in a single container. It must be remembered in selecting the liquid medium that the electrolyte should interact with the parts being treated and produce a protective layer on the surface of these components to achieve selectivity in treatment, i. e. removal of material mainly on burrs and edges with a minimum removal on the principal surfaces. An aqueous solution of copper sulfate is most effective for steel components and for parts made from zinc alloys. Brass and bronze components may be treated in solutions containing ions of copper and silver and in a complex ammonia-copper solution. 3 illustrations, bibliography of 2 titles. [Translation of abstract]

SUB CODE: 11, 13

UDC:681.112.002.2

Card 1/1

BATALOV,N.M., inzhener, laureat Stalinskoy premii; MALKIN,D.M., inzhener

Drafting work system for massproduction products. Standartizatsiia. no.2:61-67 Mr-Ap '55. (MLRA 8:6)
(Drawing-room practice)

AUTHORS: Zak, Z.D., and Malkin, D.M., Engineers 28-58-3-17/19

TITLE: Modern Requirements for a Drawing System (Sovremennyye trebovaniya k sisteme chertezhnogo khozyaystva)

PERIODICAL: Standartizatsiya, 1958, Nr 3, pp 50-56 (USSR)

ABSTRACT: The article treats problems of the development of a standard for a technical drawing system (Sistema chertezhnogo khozyaystva, of "SChKh") on which Leningradskiy filial VPTI (Leningrad Branch of VPTI) is working, the draft of which has been issued for discussion. The authors criticize the project and state that it does not meet the problem and, in parts, complicates what must be simplified. There have been no standard rules for many technical details of drawings. As a result, different industry branches or even single plants used their own conventional signs and rules. The drawings cannot be used by others without considerable preliminary work. The experience of Soviet as well as foreign industry and the recommendations of ISO/TC 10 must be utilized for the new system. It must be correlated with the corresponding standards of the East Bloc countries. The Committee of Standards, Measures and Measuring Devices must organize a special technical committee which would work out a scientific

Card 1/2

Modern Requirements for a Drawing System 28-58-3-17/39

basis for the system. There is 1 Soviet reference.

Card 2/2 1. Drafting--Standards

MALEIN, D.M.

System of mechanical drawing. Standartizatsiia 24 no.2:41-46 F '60. (MIRA 13:5)
(Mechanical drawing--Standards)

MALKIN, D.M.

Inscriptions on mechanical drawings. Standartizatsiia 24 no.9:53-54 S '60. (MIRA 13:9)
(Mechanical drawing)

MALKIN, D.Ya.

94-3-15/26

AUTHOR: Malkin, D.Ya., Engineer

TITLE: An Important Reserve of Increased Labour Productivity (Vazhnyy rezerv povysheniya proizvoditel'nosti truda)

PERIODICAL: Promyshlennaya Energetika, 1958, Vol.13, No.3, p.30 (USSR)

ABSTRACT: This brief note is a general plea for the use of a high level of illumination in industry, taking care to avoid glare. Mention is made of the investigations of Prof. A.A. Trukhanov, which did a lot to increase the output of type-setters, also of a book on industrial lighting by A.S.Shaykevich. The actual worker on the machine or bench can often give valuable guidance on correct lighting.

ASSOCIATION: State Planning Organisation Tyazhpromelektroproyekt (GPI Tyazhpromelektroproyekt)

AVAILABLE: Library of Congress

Card 1/1

MALKIN, David Yankelevich; RYABOV, M.S., red.

[Use of gas-discharge light sources] Primenenie gazorazriadnykh istochnikov sveta. Moskva, Izd-vo "Energiia," 1964. 79 p. (Biblioteka elektromontera, no.112)
(MIRA 17:4)

MALKIN, G.M.

Small-capacitance meters. Izm. tekh. no.2:80-81 Mr-Ap '57.
(Electronic measurements) (MLRA 10:6)

VERGUNAS, F.I.; MALKIN, G.M.

Photodielectric effect in ZnS--Cu, CO-phosphors. Fiz. tver. tela 2 no.9:2322-2329 S '60. (MIRA 13:10)

1. Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut.
(Phosphors) (Zinc sulfide--Electric properties)
(Dielectrics)

MALKIN, G. M.

Cand Phys-Math Sci - (diss) "Role of conduction electrons in the photo-dielectric effect of zinc sulfide phosphors." Gor'kiy, 1961. 15 pp; (Ministry of Higher and Secondary Specialist Education Ukrainian SSR, Dnepropetrovsk State Univ imeni 300th Reunion of the Ukraine with Russia); 250 copies; price not given; bibliography at end of text; (KL, 10-61 sup, 204)

20136

S/181/61/003/002/034/050
B102/B201

9,3140 (and 1138, 1140)
26.2421

AUTHOR: Malkin, G. M.

TITLE: Parallel study of the photodielectric effect and the light sum in ZnS-Cu, Co-phosphor

PERIODICAL: Fizika tverdogo tela, v. 3, no. 2, 1961, 575-577

TEXT: Among the great number of papers dealing with the photodielectric effect, there are only a few concerned with a parallel study of the optical characteristics of crystal phosphors. This is, however, required in order to obtain a direct proof of the contribution of localized or conduction electrons to the photodielectric effect (phde). This has, therefore, been the aim of the work under consideration. The change of the dielectric constant of the dielectric during attenuation of the afterglow is described by the relation (1): $\log \Delta\varepsilon = \log(\varepsilon_0 - \varepsilon_\infty) - \log(1 + \omega^2\theta^2)$, where ε_0 and ε_∞ are the ε values for $t = 0$ and $t = \infty$, θ the relaxation time of phde. It may be seen from (1) that in measurements at constant frequencies $\Delta\varepsilon$ is a function of the two

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Parallel study of the photodielectric ...

variables $\varepsilon_0 - \varepsilon_\infty$ and δ which in their turn change on the extinction of the phosphor; as for τ it is known that it increases. The author found that τ in ZnS-Cu, Co-phosphor rose from 4.10^{-7} sec (during excitation time) to 8.10^{-4} sec (after extinction over 12 hours); during the same time, $\varepsilon_0 - \varepsilon_\infty$ decreased by 11.5%. The reduction of $\Delta\varepsilon$ during extinction is thus above all due to a shift of the dispersion region toward low frequencies. Most authors believe that the presence of a phde at nitrogen temperatures is indicative of the contribution of localized electrons to the phde; however, also a change of frequency τ might explain this fact. The author was able to observe the effect, at room temperature, of the "freezing in" of phde on ZnS-Cu, Co-phosphor at a certain frequency (conservation of the phde over hours), whereas a rapid drop was observable at other frequencies. Owing to the fact that a parallelism in the change $\Delta\varepsilon$ and the change of the light sum would be a direct proof of the participation of localized electrons on phde, the author wanted to find out whether such existed. He used the method of the circle diagram by Cole (J. Chem. Phys., 9, 341, 1941) for

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the purpose. The diagrams were drawn at 20°C during excitation and at various moments of de-excitation, and in parallel thereto, the curves of thermal de-excitation, immediately after excitation was over, and at various moments of de-excitation, likewise at 20°C. The results showed that such a parallelism does not exist; the phde is thus in the main caused by conduction electrons; the same has been found by F. I. Vergunas (FTT, 2, 2322, 1960), who supervised the work under consideration. There are 1 figure and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut (Gor'kiy Research Institute of Physics and Technology)

SUBMITTED: June 20, 1960

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S/181/61/003/002/035/050
B102/B201

9,3140 (and 1138, 1140)
26.2421

AUTHOR: Malkin, G. M.

TITLE: Study of the relaxation time of the photodielectric effect in ZnS-Cu, Co-phosphor

PERIODICAL: Fizika tverdogo tela, v. 3, no. 2, 1961, 578-580

TEXT: The relaxation time θ is one of the main characteristics of the photodielectric effect (phde) of crystal phosphors; it determines the position of the region of dispersion. θ can be determined in the experimental way from the relation $\omega_{max}\theta = 1$, where ω_{max} is that frequency of the electric field in which the dielectric losses go through a maximum. In theory, relations (1) hold: $\theta = C_o/\sigma$, where σ is the conductivity and C_o the increment of capacity of the phosphor. If localized electrons are responsible for the phde, (2) will hold:

$$\theta = \frac{\varepsilon_o + 2}{\varepsilon_\infty + 2} \frac{1}{2p_o} e^{U/kT}$$, where ε_o and ε_∞ are the ε values at $\omega = 0$

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Study of the relaxation time of ...

and $\omega = \infty$, p_o the natural frequency of the localized electrons, and U the height of the inner potential barrier on the localization levels, or also simply the depth of the localization levels. To explain the experimental data, the phosphor must be assumed to be a set of levels with different values of U. It is therefore always possible to find a temperature range in which the after-glow can be ascribed to levels of one and the same depth. In this region, experimental data must be described best by the theoretical formulas. To this end, the author studied the thermal de-excitation of ZnS-Cu, Co-phosphor (3.10^{-5} g Cu/g, 10^{-6} g Co/g) and found this phosphor to have four systems of localization levels. Excitation at room temperature led to the population of the localization levels with electrons, and the curves of thermal de-excitation exhibit two peaks at 20 and 78°C. The depths of the localized levels were calculated after these curves; a depth of 0.5 ev was obtained for the 20° peak. Log ϵ was further found to be a linear function of the logarithm of attenuation time t (ϵ rises with t after a hyperbolic law). A verification of (2) is possible by measuring the

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temperature dependence of θ. The curves $\log \theta = f(1/T)$ should be straight lines, by the inclination of which it would be possible to determine the level depth. Curves like the one shown in Fig. 2, however, and not straight lines, were found by the experiments. While also in this case formula 1 describes the experimental conditions to satisfaction, formula (2) cannot be put to good use. The author also studied the change of the relaxation time of phde at nitrogen temperatures and found that after excitation was over, θ increased by more than one order of magnitude, which again is not a point in favor of formula (2). All the results are indicative of the fact that in ZnS-Cu, Co-phosphor, phde is caused by conduction electrons. F. I. Vergunas is thanked for having supervised the work. There are 2 figures and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut (Gor'kiy Research Institute of Physics and Technology)

SUBMITTED: June 20, 1960

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20137

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Study of the relaxation time of ...

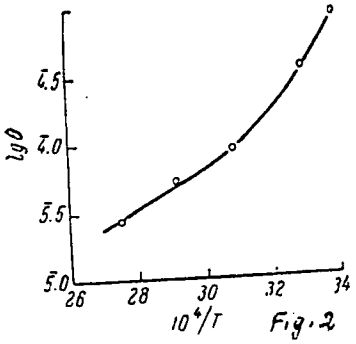

Fig. 2

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B117/B209

24.3500

AUTHOR: Malkin, G. M.

TITLE: Study of the relaxation time of the photodielectric effect in ZnS-Cu,Co phosphor

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 4, 1961, 556-559

TEXT: The present paper has been read at the 9th Conference on Luminescence (Crystal Phosphors). The author gives a report on studies concerning the relaxation time θ of the photodielectric effect in ZnS-Cu,Co phosphor. He wanted to find which of the formulas for θ given by theory is the best suited for describing experimental data: The formula $\theta = C_o/\sigma$ (1) (Ref. 1: F. I. Vergunas, G. M. Malkin., Fiz. tverd. tela, 2, 2322 (1960)), where σ denotes the conductivity, and C_o the increase in capacitance of the phosphor in the constant field during excitation, holds when the conductivity is responsible for the photodielectric effect; in this formula, the diffusion of the free electrons is taken into account. When

Study of the relaxation time of ...

localized electrons are responsible for the photodielectric effect, the formula $\theta = (\varepsilon_0 + 2)/(\varepsilon_\infty + 2)\cdot(1/2p_0)\exp(U/kT)$ (2) (Ref. 2: J. Roux, L'effet photodielectrique dans le sulfure et dans l'oxyde de zinc. - Paris, 1956) will hold (ε_0 and ε_∞ denote the dielectric constant for $\varepsilon_0 = 0$ and $\varepsilon = \infty$, respectively; p_0 is the frequency of the proper oscillations of localized electrons; U is the height of the potential barrier on the localization levels). From the curves of thermal extinction of ZnS-Cu,Co phosphor, electrons were found to be liberated from levels with equal depth at least after 11 hr at 20°C. In this case, formula (2) gives θ = const or even a slight decrease, since ε_0 decreases during the extinction. According to Eq. (2), θ can rise during quenching only when electrons escape from levels with lower U values, and the effect of levels with higher U values consequently increases. It was found that in spite of electron escape from levels of equal depth, θ increases in contrast to Eq. (2). Moreover, the variation of θ during quenching was found to obey a hyperbolic law. This is in accordance with Eq. (1) and the results of Ref. 7 (F. I. Vergunas, Yu. L. Lukantseever,

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Izv. AN SSSR, Ser. fiz., 23, 1294 (1959)) to the effect that the concentration of the free electrons which is proportional to photoconductivity decreases during the quenching of the afterglow. Formula (2) may also independently be checked by means of the temperature dependence of θ. For this purpose, the phosphor which was excited at 20°C, was slowly heated after long extinction (12 ÷ 14 hr). The center of the dispersion range was observed to shift toward higher frequencies. Also in this case, Eq. (1) is a good description of the variation of θ. Eq. (2), on the other hand, gives no satisfactory description of the dependence of θ on the duration of afterglow and on temperature, even when local levels of equal depth are occupied in the phosphor. The study of the relaxation time of the photodielectric effect at liquid hydrogen temperature has shown that formula (2) is not suited for the description of the variation of θ, either. Thus, the results proved the conclusion of Ref. 1, namely, that the photodielectric effect in ZnS-Cu,Co phosphor is due to conduction electrons. The author thanks F. I. Vergunas for having supervised this study. There are 4 figures and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc.

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B117/B209

Study of the relaxation time of ...

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut (Gor'kiy Research Institute of Physics and Technology)

Card 4/4

S/048/61/025/004/047/048
B117/B209

24.3500

AUTHOR: Malkin, G. M.

TITLE: Parallel investigation of the photodielectric effect and of the light sum in ZnS-Cu,Co phosphor

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 4, 1961, 559-561

TEXT: The present paper has been read at the 9th Conference on Luminescence (Crystal Phosphors). The author reported on a parallel investigation of the photodielectric effect and of the light sum in ZnS-Cu,Co phosphor. It was his aim to prove directly whether localized electrons or conduction electrons participate in the photodielectric effect. Circular diagrams of ZnS-Cu,Co phosphor were taken during excitation and during quenching of the afterglow at 20°C (Ref. 2: F. I. Vergunas, G. M. Malkin, Fiz. tverd. tela, v. 2, 2322 (1960)). Simultaneously with these measurements, the curves of thermal extinction immediately after stopping of the excitation and during quenching were taken at 20°C. The light sums stored in the phosphor depending on the time of afterglow were planimetrically

Parallel investigation of the ...

determined from these curves. The author obtained the following data which he compared with the values of the increase in capacitance in a constant field:

Time of quenching, [hr]	0	1	2	12
Increase in static capacitance, [pF]	56.5	50	50	50
Stored light sum, [relative units]	100	34	29	14.4

The light sum drops to about 1/3 of its value during the first hour of quenching. At the same time, the static capacitance decreases only slightly. The number of trapped electrons decreases continuously. The static capacitance remains constant. Thus it was found that in ZnS-Cu,Co phosphor at room temperature the decrease of the light sum and $\omega_0 - \omega_\infty$ are not interrelated (ω_0 and ω_∞ denote the dielectric constant at the frequencies $\omega = 0$ and $\omega = \infty$, respectively). This is in accordance with the conclusion of Ref. 2, namely, that the photodielectric effect in the phosphor concerned is chiefly due to conduction electrons. From this viewpoint one can also explain the insignificant decrease of the static capacitance during quenching, since this quantity quickly reaches saturation, depending on the concentration of the conduction electrons.

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B117/B209

Parallel investigation of the ...

The concentration of conduction electrons contained during a permanent afterglow in the phosphor is apparently sufficient for the saturation of the static capacitance. The author thanks F. I. Vergunas for having conducted this study. In the discussion to the present and to the previous lecture (I, v. 25, no. 4, 556-559), Ya. A. Oksman pointed out the fact that in spite of the numerous possibilities of photodielectric methods, the latter are still too little used in the study of processes in semiconductors. As far as the investigation of the photodielectric effect is concerned, new information on the properties of localized and free charges can be obtained only after formal methods of investigation have been developed, and after an analysis of experimental results has been completed. The method of considering the polarization field, which was suggested by Felitsiana Ignat'yevna Vergunas, appears to be interesting from this viewpoint, since with it a more detailed study of the distribution of the space charge may be avoided. As to the specimens, single crystals appear to be more suitable than powders. There are 1 figure and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

Card 3/4

22198

S/048/61/025/004/047/048
B117/B209

Parallel investigation of the ...

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut (Gor'kiy Research Institute of Physics and Technology)

Card 4/4

S/020/61/137/003/011/030
B104/B214

9.4160 (Incl. 2105, 3005; also 1136, 1469)

AUTHORS: Vergunas, F. I., and Malkin, G. M.

TITLE: The principal symptoms of photodielectric effect caused by conductivity in a granular specimen

PERIODICAL: Doklady Akademii nauk SSSR. v. 137, no. 3, 1961, 560-563

TEXT: In the present paper symptoms are given according to which the origin of photodielectric effect can be determined in each individual case. The polarization of localized electrons is designated as the photodielectric effect of the first kind, and the conductivity in a granular specimen as the photodielectric effect of the second kind. If the same mechanism holds for the polarization of localized electrons as for the thermal polarization of ions, the Eqs. (1) and (2):

$$\varepsilon = \varepsilon_\infty + \frac{4\pi A}{T(1+\omega^2 B^2 e^{2\mu/kT})};$$

$$\operatorname{tg}\delta = \frac{\omega \frac{A}{T} B e^{\mu/kT}}{\frac{\varepsilon_\infty}{4\pi} + \frac{\varepsilon_\infty}{4\pi}\omega^2 B^2 e^{2\mu/kT} + \frac{A}{T}}.$$

The principal symptoms of ...

hold for the photodielectric effect of the first kind. The formulas for the photodielectric effect of the second kind are

$$C = \frac{D}{1 + \omega^2 / L\sigma^2}, \quad (3)$$

$$\operatorname{tg}\delta = \frac{B\sigma / \omega}{1 + L\sigma^2 / \omega^2}, \quad (4)$$

Here, A is a quantity proportional to the concentration of localized electrons, $Be^{U/kT}$ the relaxation time, α the conductivity of the grains, B, D, L constants determined by the dimensions of the specimen, and C the capacitance of the specimen. Taking into account the dependence of the sum of light n and conductivity σ on E and T, the following conclusions are drawn from this formula: In the photodielectric effect (phd.E.) of the first kind tan δ tends to a constant value with increasing E, in the case of the effect of the second kind, tan δ goes through a maximum. 2) With increasing E, ω_0 is displaced in the direction of higher frequencies in both cases. However, in the case of the effect of the first

Card 2/6

The principal symptoms of ...

kind the curve representing tan δ as the function of frequency for small E values lies inside that for large E values. In the case of the phd. effect of the second kind the tan δ = g(f) curves for different E values intersect. 3) C_0, the capacitance at $\omega = 0$, depends on the conditions of excitation (E, T) in the phd. effect of the first kind but not of the second kind. The two kinds of effects may be distinguished in this manner in the case of a thermal electron polarization. By the example of ZnS-Cu, Co-P it is then shown that condition 3) is not always satisfied. It is shown in the following that Co must depend on the conditions of excitation also in phd. effect of the second kind, and the result mentioned under point 3) comes about because not all processes occurring in a phosphor can be taken into account. (3) and (4) have to be replaced by the relations:

$$C = \frac{\sigma\theta}{1+\omega^2\theta^2}; \tag{10}$$

$$\operatorname{tg}\delta = \frac{\sigma\theta^2\omega}{\sigma\theta + C_\infty(1+\omega^2\theta^2)}; \tag{11}$$

$$\theta = C_0/\sigma. \tag{12}$$

Card 3/6

The principal symptoms of ...

Here, C_∞ is the capacitance of the capacitor without excitation, σ the initial conductivity of unpolarized grains, C_o the additional capacitance in a static field, and θ the relaxation time. Criteria are given in Table 1 according to which the phd. E. may be interpreted.

phd. E. caused by conductivity in the grain	phd. E. caused by localized electrons
1) There is a frequency maximum for tan δ in which region a dispersion for C exists.	1) The same
2) ω_o decreases with increase of E. tan δ as a function of f intersect for different E.	2) ω_o or tan δ do not depend on E, but both increase with increasing E. There are no intersections of the curves tan $\delta = g(f)$.
3) The height of the maximum of tan $\delta = g(f)$ and the value of C_o decrease with the decrease of E^o or increase of T.	3) The same.

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The principal symptoms of ...

phd. E. caused by conductivity in the grain	phd. E. caused by localized electrons
4) tan δ and C have a temperature maximum	4) The same.
5) C increases with E and tends to a saturation value; tan δ goes through a maximum.	5) C and tan δ tend to a saturation value with increase of E.
6) C_o increases with N for small concentration of conduction electrons and is independent of N for large concentrations.	6) There exists a parallelism in the variation of C_o and the sum of light.

There are 4 figures, 1 table, and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut (Gor'kiy Institute of Physical and Technical Research)

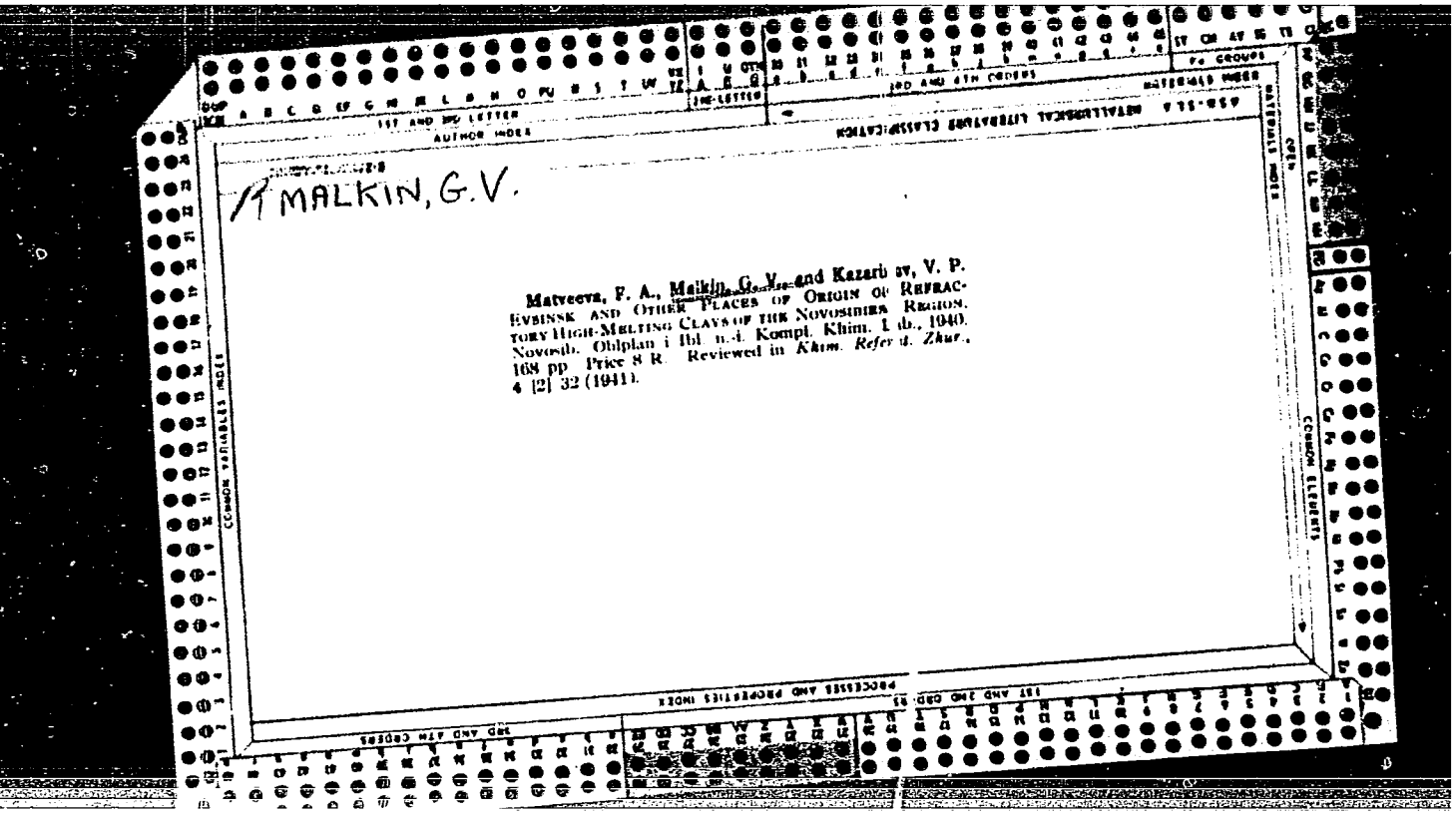
21562
S/020/61/137/003/011/030
B104/B214

The principal symptoms of ...

PRESENTED: September 24, 1960, by A. F. Ioffe, Academician

SUBMITTED: January 13, 1960

Card 6/6



MALKIN, G. V.

PA 5/49T5

USSR/Academy of Sciences
Geography

Mar/Apr 48

"Novosibirsk Department of the Geographical Society,"
G. V. Malkin, 1 p

"Iz v-s Geog Obshch" Vol LXXX, No 2

Reports activities of the branch, 1944 - 1946.
Lists officers, lectures, and publications.

5/49T5

MALKIN, I

Surname (in caps); Given Names

Country: Yugoslavia

Academic Degrees: /not given/

Affiliation: /not given/

Source: Belgrade, Veterinarski Glasnik, No 6, 1961, pp [illegible]

Data: "Contribution to the Understanding of the Effect of Castration in Male Pigs on their Growth during the Suckling Period."

Authors:

SOVLJANSKI, B.
MALKIN, I.

L 4066-66 EWT(m) DIAAP

ACCESSION NR: AT5022318 UR/3138/65/000/337/0001/0040 26 B+1

AUTHOR: Perelomov, A. M.; Popov, V. S.; Malkin, I. A. 19

TITLE: Unitary and spin content of SU(6) supermultiplets

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 337, 1965. Unitarnoye i spinovoye soderzhaniye supermul'tipletov SU(6), 1-40

TOPIC TAGS: unitary symmetry, particle symmetry, quark model, nuclear model

ABSTRACT: A method is developed for determining the number of unitary multiplets with a given spin in a supermultiplet of the SU(6) group. Some of the properties of representations of group SU(n) are summarized and a method is described for narrowing SU(6) representations into the subgroup SU(3) ⊗ SU(2), which corresponds physically to an interaction which conserves SU(3) symmetry. This method is used for compiling tables which include reductions of all SU(6) representations given by Young diagrams with total number of cells f = 3, 6 and 9. SU(6) representations are reduced with respect to subgroup SU(4) ⊗ SU(2) ⊗ U(1), which corresponds to an

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ACCESSION NR: AT5022318

interaction which separates Λ-quarks with non-zero strangeness from p- and n-quarks. The SU(4) supermultiplets obtained in this reduction are identical to the supermultiplets which were proposed by Wigner in 1937. A table for the reduction of the Kronecker product of the simplest representations of group SU(6) is also given. Orig. art. has: 6 figures, 25 formulas, 2 tables.

ASSOCIATION: Institute teoreticheskoy i eksperimental'noy fiziki Goskomiteta po ispol'zovaniyu atomnoy energii SSSR (Institute of Theoretical and Experimental Physics, State Committee on the Use of Atomic Energy SSSR)

SUBMITTED: 27Mar65 ENCL: 00 SUB CODE: MA, NP

NO REF SOV: 000 OTHER: 000

BVK
Card 2/2

MALKIN, I.A.; MANDEL'TSVEYG, V.B.

Structure of the S p_4 and SO_5 multiplets. IAd. fiz. 2 no.1:154-162 Jl '65. (MIRA 18:8)

1. Institut teoreticheskoy i eksperimental'noy fiziki Gosudarstvennogo komiteta po ispol'zovaniyu atomnoy energii SSSR.

L 11910-66 EWT(m)/T/EWA(m)-2

ACC NR: AP6001161 SOURCE CODE: UR/0367/65/002/003/0533/0542

AUTHOR: Perelomov, A.M.; Popov, V.S.; Malkin, I.A.

ORG: Institute of Theoretical and Experimental Physics, GKIAE (Institut teoreticheskoy i eksperimental'noy fiziki)

TITLE: Unitary and spin content of SU(6) supermultiplets

SOURCE: Yadernaya fizika, v. 2, no. 3, 1965, 533-542

TOPIC TAGS: particle interaction, elementary particle

ABSTRACT: A method has been developed which makes it possible to find the content of unitary multiplets of a given spin in the supermultiplet of group SU(6). An expansion table has been compiled for all the representations of SU(6) given by Young's schemes with a total number of cells f = 3, 6, and 9. The supermultiplet of SU(6) has been expanded into Wigner supermultiplets with a fixed value of the hypercharge and spin of quarks: $SU(6) \to SU(3) \otimes SU(2) \otimes U(1)$. Also given is a table for the expansion of the Kronecker product of the simplest representations of group SU(6). Orig. art. has: 1 figure, 2 tables, and 18 formulas.

SUB CODE: 20 / SUBM DATE: 26Feb65 / OTH REF: 012

Card 1/1 HW

L 9226-66 EWT(d)/EWT(l)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACC NR: AP5026101 SOURCE CODE: UR/0386/65/002/005/0230/0234

AUTHOR: Malkin, I. A.; Man'ko, V. I.

ORG: Moscow Physicotechnical Institute (Moskovskiy fiziko-tekhnicheskiy institut)

TITLE: Symmetry of the hydrogen atom

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu (Prilozheniye), v. 2, no. 5, 1965, 230-234

TOPIC TAGS: hydrogen atom, group theory, elementary particle, Lie group, wave equation, algebra

ABSTRACT: The purpose of the paper is to show that the "symmetry group" of the hydrogen atom is the non-compact group O_3, the Lie algebra of which is the algebra D_3, and to present a simple construction showing that the functions belonging to the discrete spectrum form a single infinite-dimensional irreducible representation of this algebra. This is done by defining an aggregate of operators forming an algebra closed against commutation and by calculating the matrix elements of these operators. Since the operators include those which tranform any level N into N + 1 and N - 1, respectively, it is possible to obtain from any state in succession the entire aggregate of states. This is equivalent to constructing an infinite-dimensional representation of the algebra of the operators. This representation is shown to be irreducible. The values of the Casimir operators for this representation are calculated. The representation remains irreducible when we narrow down from D_3 to the deSitter algebra.

Card 1/2

L 9226-66

ACC NR: AP5026101

A1

The algebra D_3 contains a subalgebra with the commutation relations of the algebra A_2, and therefore the levels of the hydrogen atom can also be classified with the aid of irreducible representations of this algebra. Authors are grateful to A. M. Baldin, V. B. Berestetskiy, A. A. Komar, A. M. Perelomov, V. S. Popov, and I. S. Shapiro for a discussion of the results and to M. A. Naymark for useful advice. Orig. art. has: 7 formulas.

SUB CODE: 20/ SUBM DATE: 08Jul65/ ORIG REF: 001/ OTH REF: 005

BVK.

Card 2/2

MALKIN, I. G.

"Problema Sushchestvovaniya funktsiy Lyapunova," Iz. Kazan Fiz.Mat. ob-va, Vol. 4, 1929-1930 and Vol. 5, 1931

MALKIN, I. G.

"Vopros ob ustoychivosti pri differentsialnykh uravnenii," sb. Trudov Kazanskogo aviats. in-ta, No.2, 1934

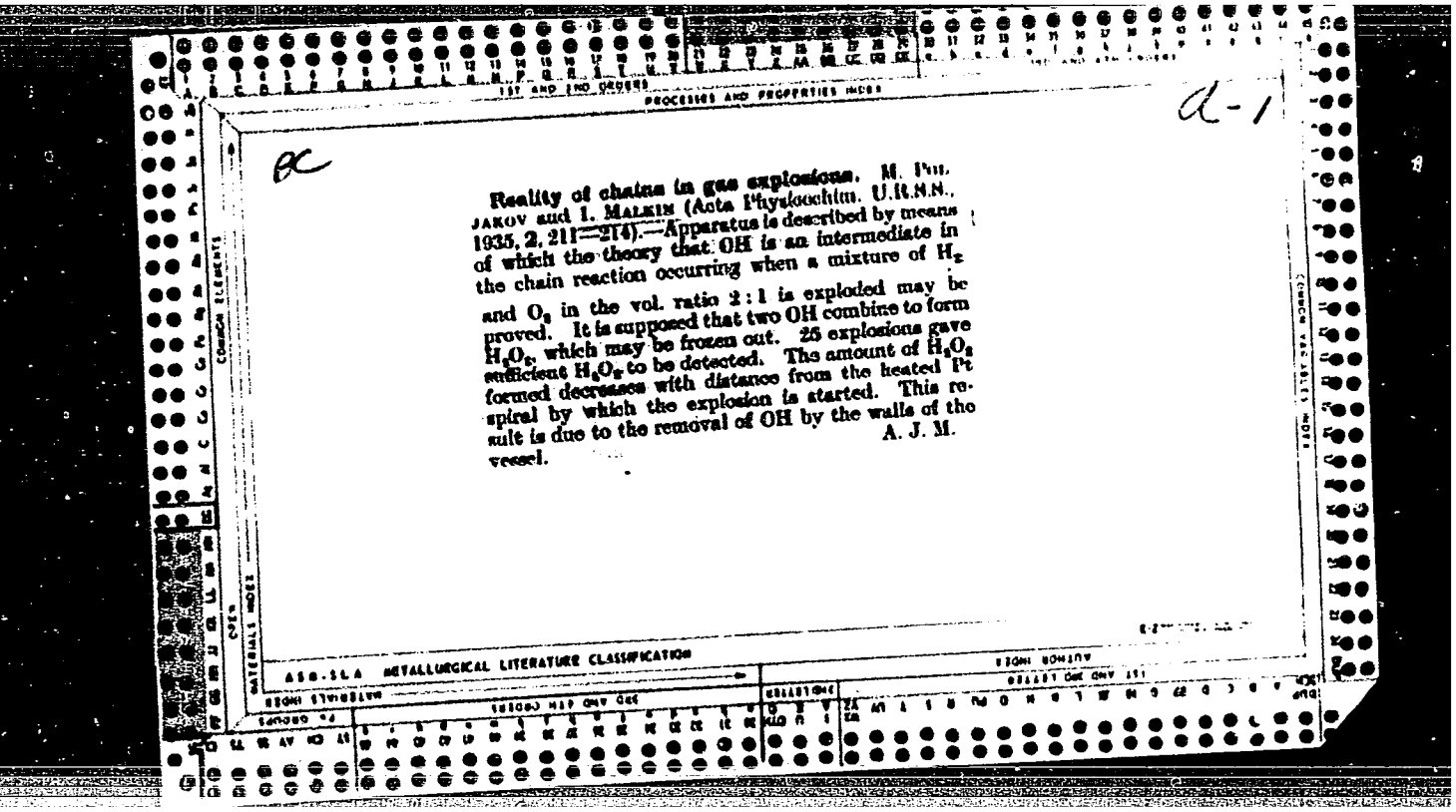
MALKIN, I. G.

Ob ustoychivosti integralov nekotorykh sistem differentsial'nykh uravneniy. Kazan', Trudy abiats. In-ta, 1 (1933), 32-37.
Die Stabilitatstrage bei differential Gleichungen. Kazan: Trudy aviats. Ub-Tam 2(1934), 21-2[illegible].
Ob ustoychivosti po pervomu priblizheniyu. Kazan', Trudy Aviats. In-Ta, 3 (1934).
Ob ustoychivosti dvizheniyz v smysle lyapunova. DAN, 15(1937), 437-440.
Nekotoryye noprosy obshchey teorii ustoychivosti dvizheniya v smysle lyapunova. M., Dissertatsiya (1937).
Ob ustoyshivosti dvizheniya v smysle Lyapu[illegible]a. Matem. SE., 3(45) (19380, 47-101.
Ob ustoyshivosti dvizheniya po pervomu pritlizheniyu. DAN, 18(1938), 15[illegible]-16[illegible].
Obobshcheniye osnovnoy teoremy lyapunova ob ustoychivosti dvizheniya. DAN, 18 (1938), 162-165.
Nelotoryye Osnovnyye teoremy ustoychivosti dvizheniya v kriticheskikh sluchayakh. Prikl. Matem. 1 Mekh., 6 (1942), 411-4[illegible]5.
Ob ustoychivosti pri postoyanno deystvuyu shchikh. Prikl. Matem. 1 Mekh., 8(1944), 241-[illegible]49
Ob ustoychivosti Periodicheskikh dvizheniy dinamicheskikh sistem. Prikl. Matem. 1 Mekh., 8(1944), 327-335.

MALKIN, I.G.

Ob Ustoychivosti Integralov Nekotorykh Sistem Differentsial'nykh Uravneniy. Kazan', Trudy Abiats. IN-TA, 1 (1933), 32-37.
Die Stabilitatstrage bei differentiai Gleichungen. Kazan: Trudy Aviats. IN-TA 2 (1934). 21-28.
Ob Ustoychivosti Po Pervomu Priblizheniyu. Kazan', Trudy Aviats. In-ta, 3 (1934)
Ob Ustoychivosti Dvizheniya V Smysle Lyapunova. DAN, 15 (1937), 437-440.
Nekotoryye Voprosy Obshchey Teorii Ustoychivosti Dvizheniya V Smysle Lyapunova M., Disse tatsiya (1937).
Ob Ustoyshivosti Dvizheniya V Smysle Lyapunova. Matem. SB., 3 (45) (1938), 47-101
Ob Ustoyshivosti Dvizheniya Po Pervomu Pri lizheniyr. DAN, 18 (1938), 15 -161.
Obobshcheniye Osnovnoy Teoremy Lyapunova Ob Ustoychivosti Dvizheniya DAN., 18 (1938), 162-165
Nekotoryye Osnovnyye Teoremy Ustoychivosti Dvizheniya V Kriticheskikh Sluchayakh. Prikl. Matem. 1 Mekh., 6 (1942), 411-428.
Ob Ustoychivosti Pri Postoyanno Deystvuyu Shchikh. Prikl. Matem. 1 Mekh, 8 (1944), 241-249

SO: Mathematics in the U ..., 1917-1947
Edite by Kurosh , A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Mos ow-Lenin rad, 1948



PROCESSES AND PROPERTIES INDEX

a-1

BC

Reality of chains in gas explosions. M. Pii. JAKOV and I. MALKIN (Acta Physicochim. U.R.S.S., 1935, 2, 211—214).—Apparatus is described by means of which the theory that OH is an intermediate in the chain reaction occurring when a mixture of H_2 and O_2 in the vol. ratio 2 : 1 is exploded may be proved. It is supposed that two OH combine to form H_2O_2, which may be frozen out. 25 explosions gave sufficient H_2O_2 to be detected. The amount of H_2O_2 formed decreases with distance from the heated Pt spiral by which the explosion is started. This result is due to the removal of OH by the walls of the vessel.

A. J. M.

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION

MALKIN, I. G.

"Ob ustoychivosti po pervomu priblizhenyu," cv trudov Kazanskogo aviats. in-ta, No.3, 1935

MALKIN, I. G.

Some problems in the theory of the stability of motion in the sense of Liapunov
Kazan', Tatknigizdat, 1947. [illegible] (Trudy Kazanskogo aviatsionnogo instituta,
(Sbornik nauchnykh trudov, no. 7)

MALKIN, I. G.

Nekotorye voprosy teorii ustoichivosti dvizheniia v smysle Liapunova. (Kazan. Kazanskii aviatsionnyi institut im. Baranova. Sbornik trudov, 1937, no. 7)

Title tr.: Certain questions of the theory of the stability of motion in the sense of Liapunov.

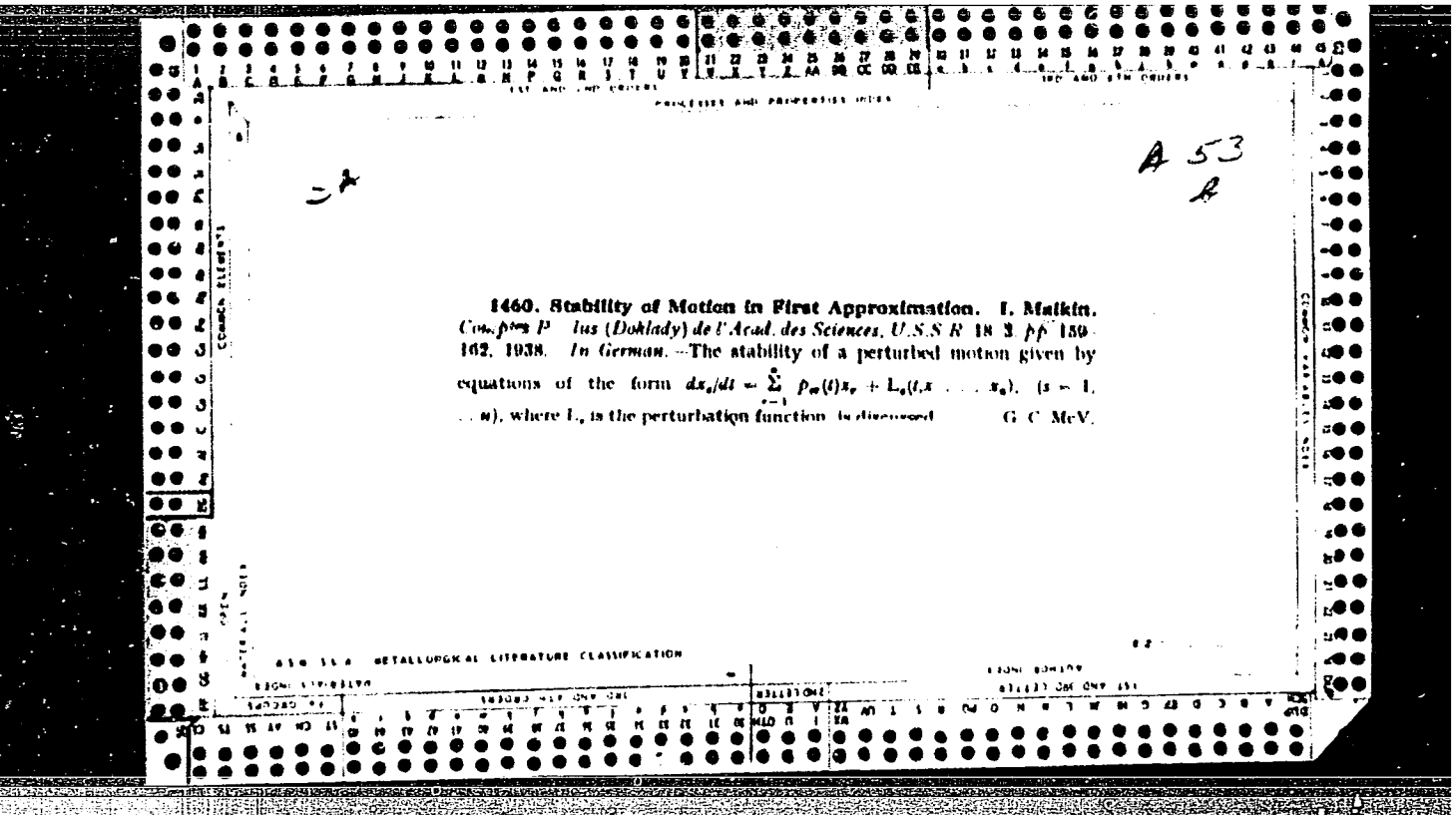
MCF

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

MALKIN, I.

Malkin, I. On the stability of motion in the sense of Lyapunov. Amer. Math. Soc. Translation no. 41, 68 pp. (1951).
Translated from Rec. Math. [Mat. Sbornik] N.S. 3(45), 47–100 (1938).

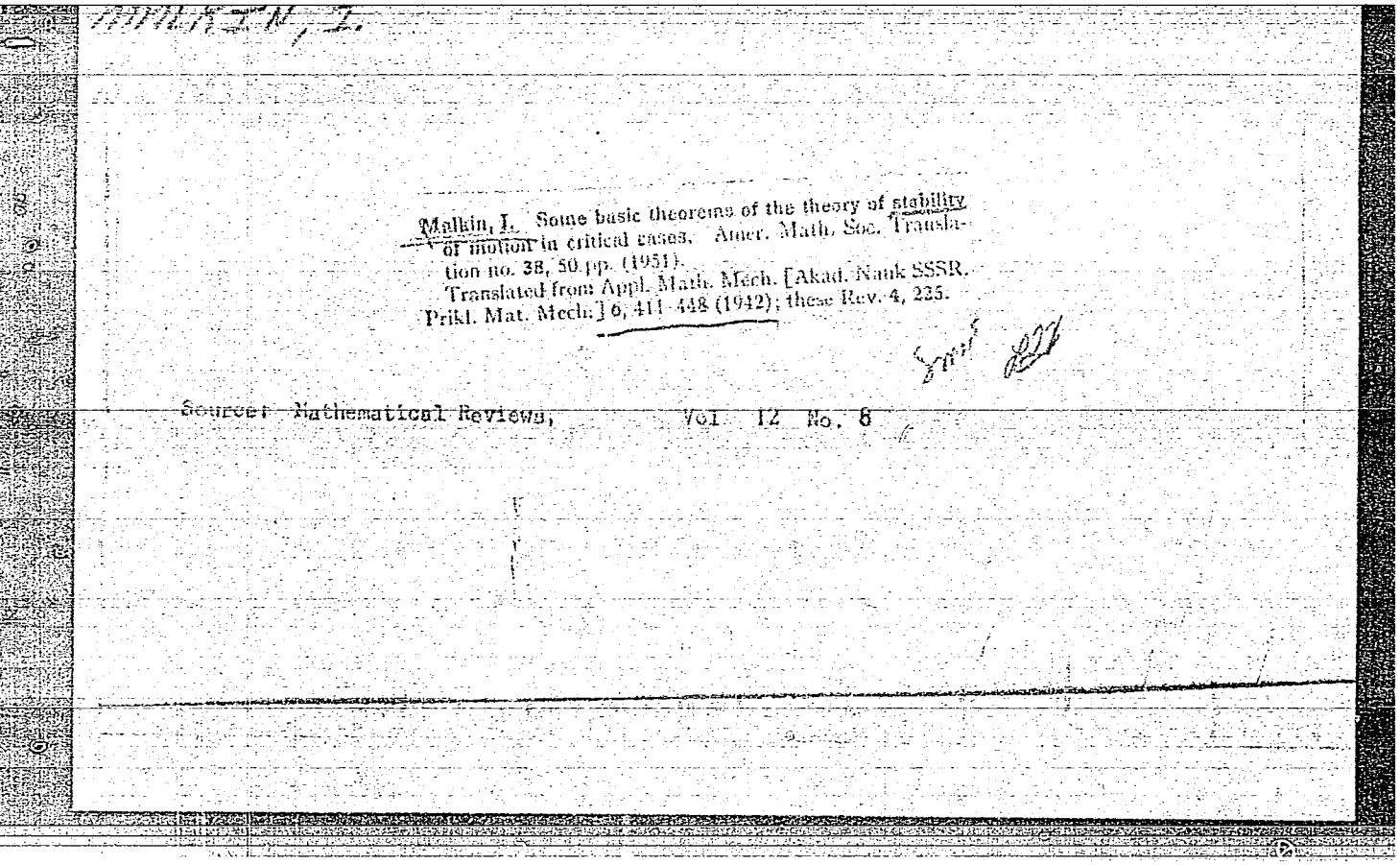
Source: Mathematical Reviews, Vol. 12 No. 8



1460. **Stability of Motion in First Approximation.** I. Malkin. *Comptes Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.* 18 3 *pp.* 159-162, 1938. *In German.*—The stability of a perturbed motion given by equations of the form $dx_s/dt = \sum_{\sigma=1}^{n} p_{s\sigma}(t)x_\sigma + L_s(t, x \ldots x_n)$, $(s = 1, \ldots n)$, where L_s is the perturbation function is discussed. G. C. McV.

MALKIN, I. G.

"Ob ustoychivosti po pervomu priblizheniyu," Dokl. AN SSSR, No.43, No.3, 1938



Malkin, I. Some basic theorems of the theory of stability of motion in critical cases. Amer. Math. Soc. Translation no. 38, 50 pp. (1951).
Translated from Appl. Math. Mech. [Akad. Nauk SSSR. Prikl. Mat. Mech.] 6, 411–448 (1942); these Rev. 4, 235.

Source: Mathematical Reviews, Vol 12 No. 8

Malkin, I. G. The oscillations of systems with one degree of freedom, close to systems of Lyapunov. Akad. Nauk SSSR. Prikl. Mat. Meh. 12, 561–596 (1948). (Russian)

The author observes that with the usual analytical methods which consider nonlinear equations as quasi-linear (i.e., the coefficients of the nonlinear terms contain a small parameter) it is not possible in general to obtain the totality of periodic solutions. He studies systems (1) $\dot{x}=-\lambda y+X(x,y)+\mu f(t,x,y,\mu)$, $\dot{y}=\lambda x+Y(x,y)+\mu F(t,x,y,\mu)$, where $X=-\partial H/\partial y$, $Y=\partial H/\partial x$ do not contain linear terms and f, F are periodic in t of period 2π; all these functions are supposed to be analytic. The nonlinear canonical system (2) $\dot{x}_0=-\lambda y_0+X(x_0,y_0)$, $\dot{y}_0=\lambda x_0+Y(x_0,y_0)$ is called the generator system of (1). The application of classical methods to (2) yields the existence (provided λ satisfies certain restrictions) of analytic solutions $[x_0^{(\alpha)},y_0^{(\alpha)}]$ periodic with period $2\pi/n$, n an integer. These "generator solutions" are the starting point for the calculation of periodic solutions of (1), analytic in μ: (3) $x^{(\alpha)}=x_0^{(\alpha)}(t-\alpha)+\mu x_1(t)+\cdots$, $y^{(\alpha)}=y_0^{(\alpha)}(t-\alpha)+\mu y_1(t)+\cdots$. Application of Poincaré's methods gives the proof of the following theorem. For the existence of a periodic solution (3) of (1) it is necessary that α be a root and sufficient that α be a simple root of the equation

$$\int_0^{2\pi}[f_0\cdot dy_0^{(\alpha)}(t-\alpha)/dt-F_0\cdot dx_0^{(\alpha)}(t-\alpha)/dt]dt=0,$$

where $f_0=f[t,x_0^{(\alpha)}(t-\alpha),y_0^{(\alpha)}(t-\alpha),0]$, and F_0 is defined similarly. The practical calculation of the series follows the usual procedure of indeterminate coefficients. A similar theorem is proved for the existence of a solution (x^0,y^0) of (1) which tends to 0 as $\mu\to 0$.

The author considers next the "resonance" cases, where $\lambda=n+\mu a$; the previous method is not valid in this case. Assuming certain restrictions on the Fourier coefficients of $f(t,0,0,0)$ and $F(t,0,0,0)$, he is able to prove that a periodic solution (x_s,y_s) of (1) exists which tends to 0 as $\mu\to 0$ and which is analytic in $\nu=\mu^\omega$, $\omega=1/(2s+1)$, s being an integer depending on the form of the solutions of (2).

After discussing stability questions, the author applies his methods to Duffing's equation:

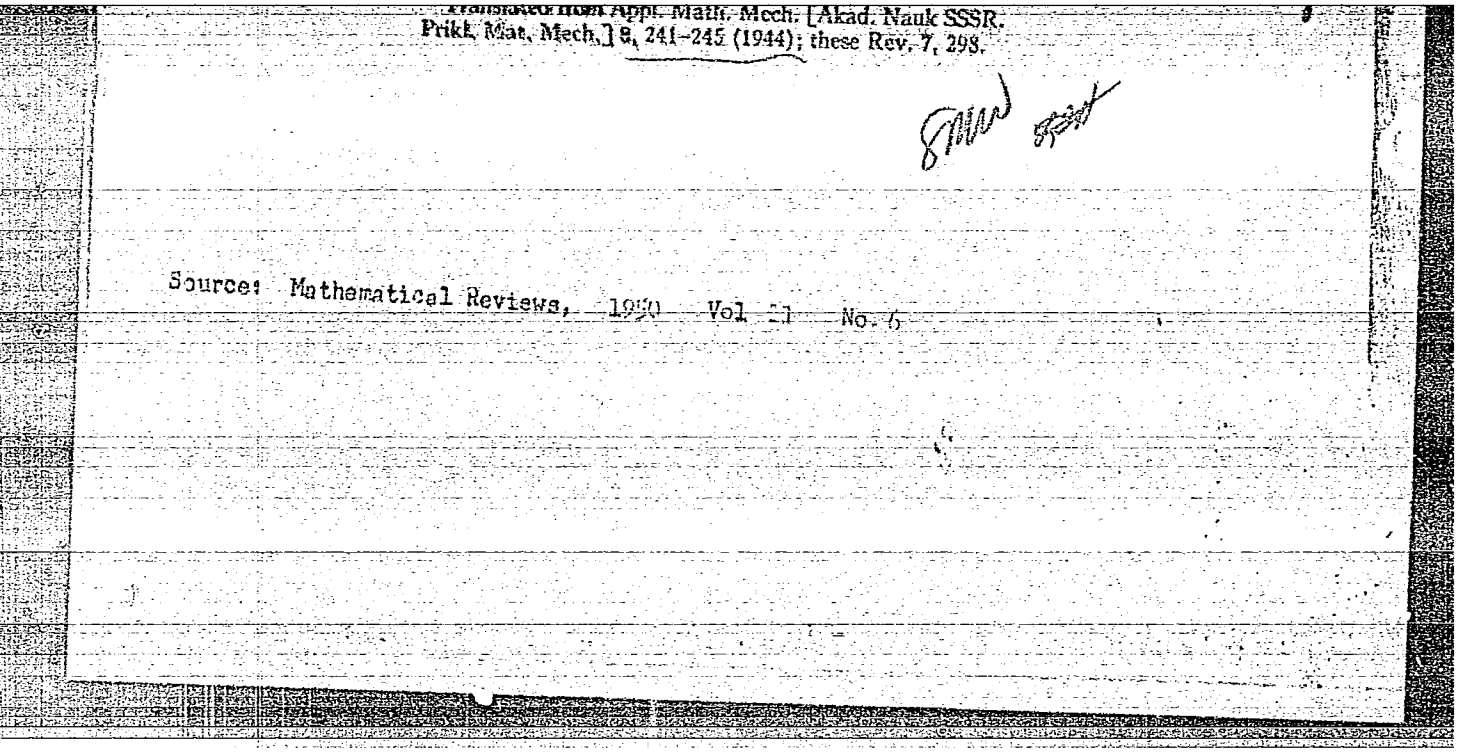
$$\ddot{x}+k^2x-\gamma x^3=\mu(a\cos pt+b\cos qt-2h\dot{x}),$$

γ, μ, h positive; p, q integers. If q/p is not an odd integer, two real solutions $x^{(p)}$ exist when $p<k$. Several terms of the series developments of these solutions, as well as of x^0 and x_s (when $k^2=p^2-\mu\lambda$) are calculated and the stability properties of these solutions are discussed in great detail with varying k.

J. L. Massera (Montevideo).

equation varying k. J. L. Massera (Montevideo).

Source: Mathematical Reviews, Vol 10 No. 7



Translated from Appl. Math. Mech. [Akad. Nauk SSSR. Prikl. Mat. Mech.] 8, 241–245 (1944); these Rev. 7, 298.

Source: Mathematical Reviews, 1950 Vol 11 No. 6

MALKIN, I. G.

Ob ustoichivosti periodicheskikh dvizhenii dinamicheskikh sistem.
(Prikladnaia matematika i mekhanika, 1944, v. 8, no. 4, p. 327-331)
Summary in English.
Title tr.: Stability of periodic motions of dynamic systems.

TA.01.P7 1944

Source: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

MALKIN, I. G.

Kolebaniia sistem s odnoi stepen'iu svobody, blizkikh k sistemam Liapunova. (Prikladnaia matematika i mekhanika, 1948, v. 12, no. 5, p. 561-596)

Title tr.: Oscillations of systems with one degree of freedom, close to systems of Liapunov.

AMOL.P/ 1948

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

MALKIN, I. G.

300

Malkin, I. G. Oscillations of systems with several degrees of freedom, close to systems of Lyapunov. Akad. Nauk SSSR. Prikl. Mat. Mek. 12, 673–690 (1948). (Russian)

This is the extension to more degrees of freedom of the paper reviewed above. The assumptions on the system are such that under a suitable real affine transformation of coordinates it takes the form

$$dx/dt = -\lambda y + X + \mu f, \quad dy/dt = \lambda x + Y + \mu F,$$
$$dx_s/dt = \sum r_{si}x_i + X_s + \mu f_s, \quad s = 1, \cdots, m,$$

where all the functions are analytic in the coordinates near the origin, X, Y and X_s contain only the coordinates and these to powers not less than 2, while f, F and the f_s contain in addition μ and t. Moreover, the constant matrix $\|r_{si}\|$ has no pure complex or zero characteristic roots. Finally it is assumed that for $\mu = 0$ there is a general integral of the form $H = x^2 + y^2 + S(x, y, x_1, \cdots, x_m) = \text{constant}$, where H is analytic at the origin and contains no linear terms, while the quadratic terms in S do not contain x or y. Under these assumptions the author succeeds in extending the results of his preceding paper to the more general situation.

S. Lefschetz (Princeton, N. J.).

Source: Mathematical Reviews, Vol 10 No. 7

Applied Mechanics
Revi ew

Mechanics (Dynamics, Statics, Kinematics)

©1839. I. G. Malkin, The methods of Liapounoff and Poincaré in the theory of nonlinear vibrations (Metodi Lyapunova i Puankare v teorii nelinetnikh kolebanii) (in Russian), Leningrad-Moscow, OGIZ, 1949, 243 pp. Paper, 4.2 × 6.5 in., $1.

Book culminates in presentation of author's own results on systems close to Liapounoff's (Rev 3, 1056). Chapter titles are: General Poincaré theory of periodic motions, 24 pp.; Oscillations of a quasilinear system, 65 pp. (for a quasilinear system the coefficients of the expansion in powers of the small parameters and initial values satisfy a system of linear equations with constant coefficients); Stability of periodic motions, 48 pp.; Liapounoff's theory of periodic solutions, 27 pp.; Oscillations of systems of one degree of freedom close to Liapounoff's systems, 38 pp., Oscillations of systems of several degrees of freedom close to Liapounoff's systems.

A. W. Wundheiler, USA

1450

Malkin, I. G. On Poincaré's theory of periodic solutions. Akad. Nauk SSSR. Prikl. Mat. Meh. 13, 633–646 (1949). (Russian)

Consider a real system Σ_μ: $\dot{x}_s = X_s(t, x_1, \cdots, x_n, \mu)$, $s = 1, 2, \cdots, n$, where the X_s are continuous with period 2π in t, and have continuous first derivatives in the other variables for (x) in a certain region G and $|\mu|$ small. Given the existence of a family of periodic solutions of the system Σ_0 depending upon k parameters, the author discusses quite fully the existence of periodic solutions of Σ_μ generated by those of Σ_0. [The same questions are dealt with for analytical systems in The Methods of Lyapunov and Poincaré in the Theory of Nonlinear Oscillations, OGIZ, Moscow-Leningrad, 1949; these Rev. 12, 28]. *S. Lefschetz.*

Source: Mathematical Reviews, Vol. [illegible], No. [illegible]

MALKIN, I. G.

Kolebaniia kvazilineinykh sistem s neanaliticheskoi kharakteristikoi nelineinosti. (Prikladnaia matematika i mekhanika, 1950, v. 14, no. 1, p. 13-22, bibliography)

Title tr.: Oscillations of quasi-linear systems with a non-analytic characteristic of nonlinearity.

QA801.P7 1950

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

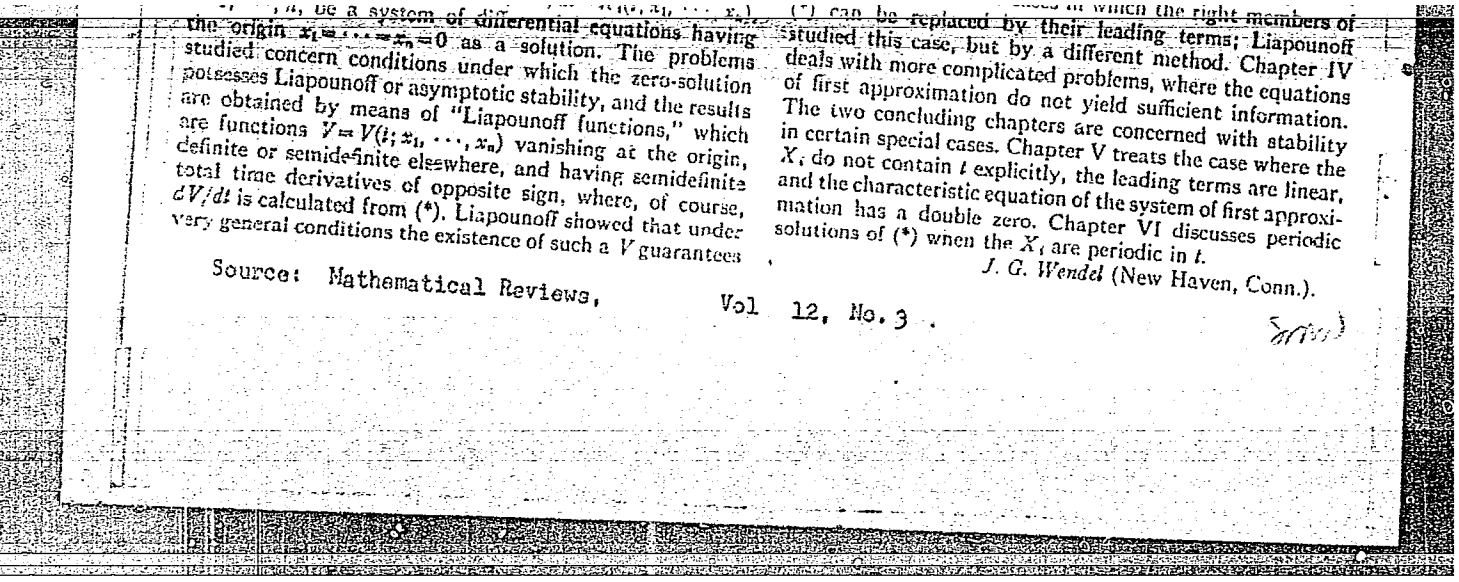
Malkin, I. G. On the theory of oscillations of quasilinear systems with many degrees of freedom. Akad. Nauk SSSR. Prikl. Mat. Mekh. 14, 353–370 (1950). (Russian)

In the present paper the author continues to follow the program which he seems to have drawn for himself, to extend to more or less general nonanalytical systems of differential equations results already acquired for analytical systems. He now considers a quasi-linear system of order n: $dx_s/dt=\sum a_{sr}x_r+\mu f_s(t, x_1, \cdots, x_n)$, $s=1, \cdots, n$, where the a_{sr} are constants, μ is a small parameter, and the functions f_s are continuous with period 2π in t and have Fourier expansions. Relative to x, they have continuous first partial derivatives satisfying a Lipschitz condition in a certain domain. The problem is to find periodic solutions of period 2π which for $\mu=0$ tend to similar solutions of the limiting linear system. In a previous paper [see the preceding review] the author discussed what happens when the linear system has a periodic solution depending upon a certain number of parameters. The results of that paper are applied here with particular emphasis on resonance, i.e., when the matrix of the a_{ij} has a certain number of characteristic roots which are zero, or of the form $\pm mi$, m an integer. The solutions are obtained by successive approximations giving rise to series which are shown to converge. [Further relevant references: Malkin, same journal 14, 13–22 (1950); these Rev. 12, 28; A. I. Lur'e, ibid. 12, 353–362 (1948); these Rev. 10, 193]. *S. Lefschetz* (Princeton, N. J.).

Malkin, I. G. Certain questions on the theory of the stability of motion in the sense of Liapounoff. Amer. Math. Soc. Translation no. 20, 173 pp. (1950).

[Translated from Sbornik Naučnyh Trudov Kazanskogo Aviacionnogo Instituta im. P. I. Baranova, no. 7, 1937.]

This volume gives a clear and detailed treatment of a number of diverse questions on stability of motion, presented in a unified way. Let (*) $dx_i/dt = X_i(t; x_1, \cdots, x_n)$, $i = 1, \cdots, n$, be a system of differential equations having the origin $x_1 = \cdots = x_n = 0$ as a solution. The stability of $(0, \cdots, 0)$; mild additional restrictions yield asymptotic stability. In chapters I and II the author investigates the converse proposition, and obtains general conditions under which stability implies the existence of a Liapounoff function; in I, $n = 2$, and t is absent from the right members; in II the equations are linear with uniformly bounded coefficients. In chapter III the method of Liapounoff functions is applied to cases in which the right members of (*) can be replaced by their leading terms; Liapounoff studied this case, but by a dif-



the origin $x_1=\cdots=x_n=0$ as a solution. The problems studied concern conditions under which the zero-solution possesses Liapounoff or asymptotic stability, and the results are obtained by means of "Liapounoff functions," which are functions $V=V(t; x_1, \cdots, x_n)$ vanishing at the origin, definite or semidefinite elsewhere, and having semidefinite total time derivatives of opposite sign, where, of course, dV/dt is calculated from (*). Liapounoff showed that under very general conditions the existence of such a V guarantees

studied this case, but by a different method. Chapter IV deals with more complicated problems, where the equations of first approximation do not yield sufficient information. The two concluding chapters are concerned with stability in certain special cases. Chapter V treats the case where the X_i do not contain t explicitly, the leading terms are linear, and the characteristic equation of the system of first approximation has a double zero. Chapter VI discusses periodic solutions of (*) when the X_i are periodic in t.

J. G. Wendel (New Haven, Conn.).

Source: Mathematical Reviews, Vol 12, No. 3 .

Malkin, I. G. On the theory of stability of regulating systems. Akad. Nauk SSSR. Prikl. Mat. Meh. 13, 59–66 (1951). (Russian)

Using the second method of Liapounoff, the author discusses the stability of the system $dy/dt = Ay + f(u)h$, where A is a constant matrix, h is a constant vector and f is a scalar function of a linear function of the components of y.

R. Bellman (Stanford University, Calif.).

Source: Mathematical Reviews, Vol 12 No. 9.

West State U.

Malkin, I. G. On the solution of a stability problem in the case of two purely imaginary roots. Akad. Nauk SSSR. Prikl. Mat. Meh. 15, 255–257 (1951). (Russian)

Consider the analytical system of $n+2$ equations

$$\left\{\begin{aligned}\frac{dx}{dt}&=-\lambda y+X,\quad \frac{dy}{dt}=\lambda x+Y,\\ \frac{dx_s}{dt}&=p_s x+q_s y+\sum p_{sr}x_r+X_s=f_s(x,y,x_1,\cdots),\end{aligned}\right. \tag{1}$$

where λ, p_s, q_s, p_{sr} are real constants, and X, Y, X_s are real analytic functions of x, y and the x_r in a neighborhood of the origin with expansions beginning with terms of degree at least two. It is assumed that the characteristic roots, other than $\pm\lambda i$, all have negative real parts. According to Lyapunov the stability problem may be dealt with as follows. Take the auxiliary system

$$(\lambda x+Y)\frac{\partial v_s}{\partial y}+(-\lambda y+X)\frac{\partial v_s}{\partial x}=f_s. \tag{2}$$

This system has a formal solution

$$v_s(x,y)=v_s^{1}(x,y)+v_s^{2}(x,y)+\cdots, \tag{3}$$

where v_s^k is a form of degree k. Then the stability of (1) is equivalent to that of

$$\frac{dx}{dt}=-\lambda y+X(x,y,v_1,\cdots,v_n),\quad \frac{dy}{dt}=\lambda x+Y(x,y,v_1,\cdots,v_n).$$

The calculation of the forms v_s is rather arduous. The author shows however that once the v_s^1 are known then the calculation of the v_s^k, $k>1$, is comparatively simple.

S. Lefschetz (Princeton, N. J.).

Source: Mathematical Reviews, Vol 13 No.

Source: Mathematical Reviews, Vol 13 No. 4

Malkin, I. G. On a method of solution of the problem of stability in the critical case of a pair of purely imaginary roots. Akad. Nauk SSSR. Prikl. Mat. Meh. 15, 473–484 (1951). (Russian)

A real system

$$x' = \lambda y + X(x', y'), \quad y' = -\lambda x' + Y(x', y'),$$

where X, Y are analytical at the origin and begin with second degree terms at least may be put in the form

$$x = \lambda x + Z(x, y), \quad y = -\lambda x + Z(y, x)$$

The author applies a transformation

$$x = x' + x^{(2)}(x', y') + x^{(3)}(x', y') + \cdots,$$
$$y = y' + y^{(2)}(x', y') + y^{(3)}(x', y') + \cdots,$$

where $x^{(2)}$, $y^{(2)}$ are forms of degree j to reduce the system to

$$\dot{x} = \lambda x + \lambda(A_{11}xy + A_{12}x^2y^2 + \cdots + A_{n+1,n}x^{n+1}y^{n+1} + \cdots),$$
$$\dot{y} = -\lambda x + \lambda(A_{20}x^2 + \cdots),$$

where the A_j are constants, and thus succeeds in simplifying greatly the Lyapunov system for stability. Let A_1 be the first constant which is not pure imaginary: $A_1 = g + ih$. $g \neq 0$. It is the same g as occurs in the calculations of Lyapunov. If $g < 0$ the system is stable, if $g > 0$ it is unstable. An analogous treatment is applied to a system of n equations with a pair of pure imaginary characteristic roots and shown to simplify computations considerably. [Relevant references: Lyapounoff, Problème général de la stabilité du mouvement, Ann. of Math. Studies, no. 17, Princeton Univ. Press, 1947; Malkin, Akad. Nauk SSSR. Prikl. Mat. Meh. 15, 255–257 (1951); these Rev. 9, 34, 13, 38.]

S. Lefschetz (Princeton, N. J.).

Malkin, I. G. Solution of some critical cases of the problem of stability of motion. Akad. Nauk SSSR. Prikl. Mat. Meh. 15, 577–590 (1951). (Russian)

In the paper reviewed above the author gave a simplified method for settling the problem of stability of a system

$$\frac{dx}{dt} = -\lambda y + X, \quad \frac{dy}{dt} = \lambda x + Y,$$

$$\frac{dz_s}{dt} = \sum_{k=1}^{n} p_{sk} z_k + p_s x + q_s y + Z_s, \quad s = 1, 2, \ldots, n,$$

where X, Y, Z_s are analytic in x, y, z_s and the z_s in the neighborhood of the origin and begin with terms of degree ≥ 2 and where the characteristic roots of $\|p_{sk}\|$ have negative real parts. The same general type of simplification is now extended to a similar system

$$\frac{dy_j}{dt} = \sum_{k=1}^{n} b_{jk} z_k + Y_j, \quad j = 1, 2, \ldots, n,$$

$$\frac{dz_s}{dt} = \sum_{k=1}^{n} p_{sk} z_k + Z_s, \quad s = 1, 2, \ldots, n,$$

under the following two hypotheses: (a) $k = 4$ and the characteristic roots of $\|p_{sk}\|$ are purely complex; (b) $k = 3$ and the characteristic roots of $\|p_{sk}\|$ are zero and $\pm\lambda i$. It is still assumed that the characteristic roots of $\|p_{sk}\|$ have negative real parts. The method is also extended to the case where the coefficients of the Y_j and Z_s are periodic in t with the same period. [Additional references: G. V. Kamenkov, Sbornik Trud. Kazan. Aviac. Inst., no. 9 (1939); Malkin, Sbornik Nauk. SSSR. Prikl. Mat. Meh. 6, 411–448 (1942); these Rev. 4, 225; Mat. Sbornik N.S. 3(45), 47–101 (1938).]

S. Lefschetz (Princeton, N. J.).

Source: Mathematical Reviews, Vol 13 No. 4

Malkin, I. G. A theorem on stability in the first approximation. Doklady Akad. Nauk SSSR (N.S.) 76, 783–784 (1951). (Russian)

Let

$$(1) \qquad \dot{x}_s = X_s^{(m)}(x_1, \cdots, x_n) + \varphi_s(t, x_1, \cdots, x_n),$$

$s = 1, 2, \cdots, n$, where $X_s^{(m)}$ are forms of the mth degree ($m \geqq 1$) and $|\varphi_s| \leqq A(|x_1| + \cdots + |x_n|)^m$, A constant. The following theorem is proved: If $x = 0$ is an asymptotically stable solution of the system $\dot{x}_s = X_s^{(m)}$, then the same is true for (1), whatever the functions φ_s may be, provided A is small enough. *J. L. Massera* (Montevideo).

Source: Mathematical Reviews, Vol 12 No. 10

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*Malkin, I. G. Teoriya ustoĭčivosti dviženiya. [Theory of stability of movement.] Gosudarstv. Izdat. Tehn.-Teor. Lit., Moscow-Leningrad, 1952. 432 pp. 17 rubles.

This is a clear and systematic exposition of the theory of stability, including the most important results achieved in this field up to the recent years. The first three chapters are rather elementary in character and include clearly stated and proved theorems and examples of applications to typical physical problems, so that engineers and technicians with a moderate mathematical training shall be able to use them in the analysis of the majority of problems appearing in practice. The following chapters are of a deeper mathematical content and require a greater maturity to master them. A short account of the contents follows: Chapter I: introduction, definitions, examples. Chapter II: the "second method" of Lyapunov, fundamental theorems on (simple) stability, asymptotic stability and unstability and their application to autonomous systems. Chapter III: stability

(over)

MALKIN, I. G.

in the first approximation in the non-critical cases. Chapter IV: critical cases for autonomous systems with one vanishing or two purely imaginary characteristic roots; the problem of centers. Chapter V: general theorems of Lyapunov and Četaev for non-autonomous systems, linear systems with periodic coefficients, reducibility, methods for the approximate calculation of the characteristic exponents, stability in the first approximation for periodic systems in the non-critical and in the simplest critical cases. Chapter VI: general theorems of the author on stability under permanently acting perturbations, theorems of the author, Persidskiĭ and the reviewer on the reciprocal of Lyapunov's theorem on asymptotic stability, applications to stability under permanently acting perturbations; general linear systems, characteristic numbers of Lyapunov, regular systems, theorems of Lyapunov, Perron, Persidskiĭ, Četaev, Poincaré and the author about stability and other properties of characteristic numbers; general theorems on stability in the first approximation; critical cases of autonomous and periodic systems with two vanishing, or one vanishing and a pair of purely imaginary, or two pairs of purely imaginary characteristic exponents. *J. L. Massera* (Montevideo).

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MALKIN, I. G.

Lure, A. I.

"Several non-linear problems in the theory of automatic control." A. I. Lur'ye. Reviewed by I. G. Malkin. Sov. kniga no. 8, 1952.

Monthly List of Russian Accessions, Library of Congress, December 1952. Unclassified.

MALKIN, I. G.

USSR (600)

Stability

Stability of systems of automatic control. Prikl mat. i mekh. 15, No 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, November 1952. Unclassified.

Malkin, I. G.

Source: Mathematical Reviews, Vol. 13 No. 7

Malkin, I. G. On the characteristic values of linear differential equations. Akad. Nauk SSSR Prikl. Mat. Meh. 16, 3–14 (1952). (Russian)

Let the characteristic numbers (=c.n.) λ_i in the sense of Lyapunov [see Problème général de la stabilité du mouvement, Princeton Univ. Press, 1947, pp. 225–243; these Rev. 9, 34] of the system

(1) $$\dot{x}_s = \sum p_{sj} x_j, \quad s, j = 1, 2, \cdots, n$$

be known. It is proposed to compare with them those λ_i' of

(2) $$\dot{x}_s = \sum (p_{sj} + \varphi_{sj}) x_j.$$

Here p_{sj}, φ_{sj} are continuous and bounded on $[0, \infty]$ and $\lambda_1 \geqq \cdots \geqq \lambda_n$, $\lambda_1' \geqq \cdots \geqq \lambda_n'$. The set $\{\lambda_i\}$ is stable whenever given ϵ arbitrarily small there is an $\eta(\epsilon)$ such that if the $|\varphi_{sj}| \leqq \eta$ then the $|\lambda_i - \lambda_i'| < \epsilon$. The set of n linearly independent solutions x_{sj} is normal whenever it has as many c.n.'s λ_i as possible and λ_n, then $\lambda_{n-1}, \cdots$, are in turn repeated as often as possible [Lyapunov, loc. cit., p. 233]. The system (1) is regular [ibid., p. 237] whenever the sum of the c.n.'s in a set of normal solutions is $-\mu$ where μ is the c.n. of $\exp(-\int p_{ss} dt)$.

Let $\bar{x}_{sj}(t, t_0)$ denote the system of solutions of (1) such that $\bar{x}_{sj}(t_0, t_0) = \delta_{sj}$ and let μ_j be the c.n. of the solution $\bar{x}_{sj}$. It is supposed that (1) is such that whatever $\gamma > 0$:

(3) $$|\bar{x}_{sj}| < C(\gamma) e^{(-\mu_j + \gamma)(t - t_0)} \quad \text{for} \quad t \geqq t_0 \geqq 0$$
$$|\bar{x}_{sj}| < C(\gamma) e^{(-\mu_j - \gamma)(t - t_0)} \quad \text{for} \quad t_0 \geqq t \geqq 0.$$

Theorem 1. If (3) holds then given ϵ there is an η such that if the $|\varphi_{sj}| \leqq \eta$ then the $\lambda_i' \geqq \lambda_i - \epsilon$. Theorem 2. Under the same conditions if (1) is regular then the set $\{\lambda_i\}$ is stable.

Suppose now that

(4) $$|\bar{x}_{sj}| < M \exp(-\alpha(t - t_0)), \quad M > 1, \quad \alpha > 0$$

where α is independent of t_0. Let m denote the largest number of terms in any expression $\sum_j \bar{x}_{sj} (\varphi_{j1} x_1 + \cdots + \varphi_{jn} x_n)$. Theorem 3. If (4) holds then the λ_i' will all be positive if the φ_{sj} satisfy $|\varphi_{sj}(t)| < \alpha / mM$.

[Additional references: Bylov, B. F., same journal 14, 114–116, 341–352 (1950); these Rev. 11, 516; 12, 180; Persidskiĭ, K. P., Izvestiya Akad. Nauk Kazah. SSR. Ser. Mat. Meh. 1 (1947); Četaev, N. G., Ustoĭčivost' dviženiya, Gostehizdat, 1946; Shtokalo, I. Z., Mat. Sbornik N.S. 19(61), 263–286 (1946); these Rev. 8, 329].

S. Lefschetz (Princeton, N. J.).

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Malkin, I. G. On the construction of Lyapunov functions for systems of linear equations. Akad. Nauk SSSR. Prikl. Mat. Meh. 16, 239–242 (1952). (Russian)

Let $L_r = p_{r1}x_1 + \cdots + p_{rn}x_n$ be a system of differential equations, p_{rs} being continuous bounded functions of t in $[0, \infty)$. Let $x^0_{rs}(t, t_0)$ be a fundamental system of solutions, $x^0_{rs}(t_0, t_0) = \delta_{rs}$, and assume $|x^0_{rs}(t, t_0)| < Me^{-\alpha(t-t_0)}$ for $t \geq t_0 \geq 0$, M, α positive constants. Let $W(t, x_1, \cdots, x_n)$ be any positive definite form of degree m in $x_1, \cdots, x_n$ whose coefficients are continuous bounded functions of t. Then

$$V = \int_t^\infty W(\tau, y_1, \cdots, y_n)d\tau,$$

where $y_r = x^0_{r1}(\tau, t)x_1 + \cdots + x^0_{rn}(\tau, t)x_n$, is a positive definite function of Lyapunov, which is a form of degree m in $x_1, \cdots, x_n$ with bounded coefficients, satisfying the equation $dV/dt = -W$. This theorem generalizes previous results by Lyapunov and Malkin. *J. L. Massera* (Montevideo).

Source: Mathematical Reviews, Vol 13 No. 10

MALKIN, I. G.

USSR (600)

Stability

One problem of the theory of stability of systems of automatic regulation. Prikl. mat. i mekh. 16 no. 3 (1952)

9. Monthly List of Russian Accessions, Library of Congress, August 1953. Unclassified.

MALKIN, I. G.

USSR/Physics - Automatic Regulation Jul/Aug 52

"Stability of Systems of Automatic Regulations," I. G. Malkin, Sverdlovsk, Ural State U

"Prik Matemat i Mekh" Vol XVI, No 4, pp 495-499

Following M. A. Ayzerman ("Nonlinear Functions of Several Arguments in Investigations of the Stability of Autoregulation Systems," "Avtomat i Telemekh" Vol VIII, No 1, 1947, the author studies the problem of the stability of the position of equil $x_1=x_2=\ldots x_n=0$ of a regulated system described by the system of differential eqs: $dx_s/dt=p_{s1}x_1+\ldots + p_{sn}x_n + F_s(x_1,..,x_n)$ (where $s=1,2,..,n$).

225T92

1. MALKIN, I. G.

2. USSR (600)

4. Stability

7. Theory of stability. I. G. Malkin. Reviewed by L. Ye. El'sgol'ts. Usp. mat. nauk 8, No. 2, 1953.

Subject book (Teoriya Ustoychivosti) was published 1952 by State Tech Press, 431 pages, 6000 copies, 17 rubles. Reviewer states that the book is a valuable addition to mathematical literature and reveals the author's exceptional mastery of exposition, thanks to which difficult material is made accessible to a wide circle of readers. 250T99

9. **Monthly List of Russian Accessions, Library of Congress, April 1953. Unclassified.**

MALKIN, I. G.

USSR/Mathematics - Stability, Liapounoff 11 Jun 52

"A Theorem Concerning the Stability of Motion," I. G. Malkin, Ural State U imeni A. M. Gor'kiy

"Dok Ak Nauk SSSR" Vol LXXXIV, No 5, pp 877, 878

Considers the following system of differential eqs describing perturbed motion: $dx_s/dt = X_s(t;x_1,..,x_n) + X'_s(t;x_1,..,x_n)$ $(s = 1,..,n)$, where X_s and X'_s become zero for $x_1 = .. = x_n = 0$. Establishes the following theorem: If for the functions X'_s we have $X'_s = 0$ when $t = \infty$ and if the nondisturbed motion $(x_1 = .. = x_n = 0)$ for eqs $dx_s/dt = X_s$ is asymptotically stable in Liapounoff's sense, then the same is true for the 1st eq, $x'_s = X_s + X'_s$. Submitted by Acad I. G. Petrovskiy 11 Mar 52.

223T71

MALKIN, I. G.

Name	Title of [illegible]	[illegible]
Malkin, I. G.	"The Theory of the Stability of Motion"	Ural State University, Institute of Mechanics, Academy of Sciences USSR

MALKIN, I. G.

USSR/Mathematics - Asymptotic Stability FD-646

Card 1/1 : Pub. 85 - 1/20

Author : Malkin, I. G. (Sverdlovsk)

Title : Problem of the reversibility of Lyapunov's theorem on asymptotic stability

Periodical : Prikl. mat. i mekh., 18, 129-138, Mar/Apr 1954

Abstract : Establishes the conditions necessary and sufficient for the existence of the Lyapunov function satisfying all the conditions of Lyapunov's theorem on asymptotic stability. Refers to his earlier work (1937) and 6 other works, including S. Gorshin, "Stability of motion with constantly acting excitation," Izvestiya AN Kazakhskoy SSR, No 56, 1948.

Institution : Ural State University

Submitted : December 7, 1953

MALKIN, I. G.

USSR/Mathematics - Resonant harmonic system FD-845

Card 1/1 : Pub. 85 - 10/14

Author : Malkin, I. G. (Sverdlovsk)

Title : Resonance in quasiharmonic systems

Periodical : Prikl. mat. i mekh., 18, 459-463, Jul/Aug 1954

Abstract : Establishes the conditions necessary and sufficient for the existence of almost periodic solutions to systems of linear nonhomogeneous equations with periodic coefficients and with almost periodic right parts. No references.

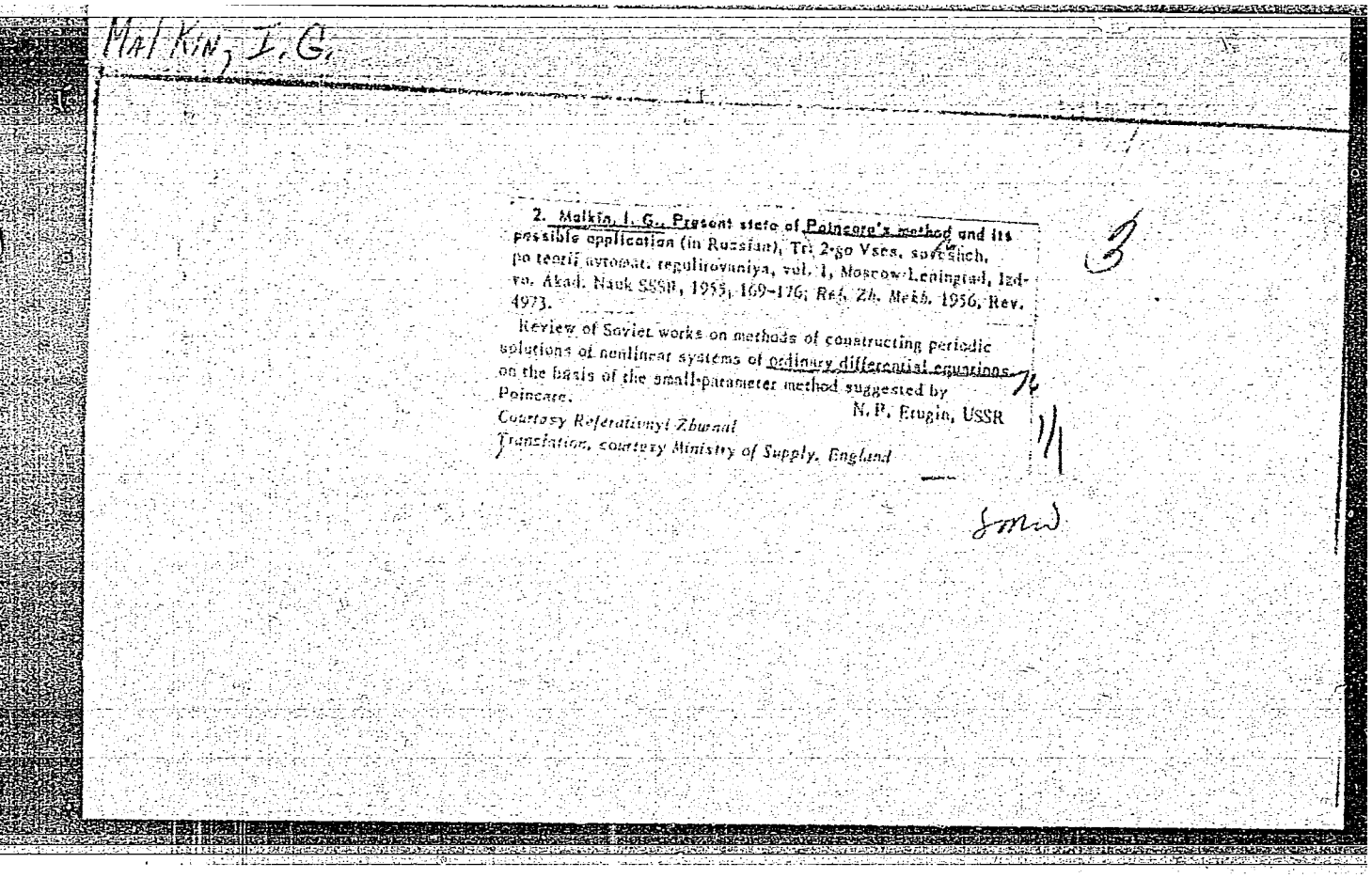
Institution : Ural State University

Submitted : April 19, 1954

[redacted] (Sverdlovsk)

Near-periodic oscillations of nonlinear non-autonomous systems. Prikl. mat. i mekh. 18 no.6:681-704 N-D '54. (MLRA 8:3)

1. Ural'skiy gosudarstvennyy universitet.
(Vibration) (Mathematical physics)



Malkin, I. G.

2. Malkin, I. G., Present state of Poincare's method and its possible application (in Russian), Tr. 2-go Vses. soveshch. po teorii avtomat. regulirovaniya, vol. 1, Moscow-Leningrad, Izd-vo. Akad. Nauk SSSR, 1955, 169–176; *Ref. Zh. Mekh.* 1956, Rev. 4973.

Review of Soviet works on methods of constructing periodic solutions of nonlinear systems of ordinary differential equations on the basis of the small-parameter method suggested by Poincare.

N. P. Erugin, USSR

Courtesy Referativnyi Zhurnal

Translation, courtesy Ministry of Supply, England

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