KURAEV, Aleksandr

Pressure conditions in pipe networks. Vodni hosp 13 no.5:188-191 '63.

1. Hydroprojekt, Praha.

DUNAYEV, P.F., kand.tekhn.nauk; KUBAREV, A.I., inzh.

Methods for calculating dimension diagrams having the α_i and K_i coefficients given by two limiting values. Vest.mash. 41 no.9: 33-37 S '61. (MIRA 14:9)

(Mechanical engineering)

ZHURTSEV, V.O.; KUBAREV, A.I.; USAN, M.V.

Determination of the zones of tolerance for the ajustment of machine tools. Priborostroenie no.12:21-24 D '64.

(MIRA 18:3)

KUBAREV, A.I.; USAN, M.V.; ZHURTSEV, V.G.

Organization of a preventive statistical control. Standartizatsiia 28 no.6:38-42 Je '64. (MIRA 17:9)

USAN, M.V.; ZHURTSEV, V.G.; KUBAREV, A.I.

Effect of some technological factors on the operating precision of automatic lathes for longitudinal form turning. Stan. i instr. 35 no.10:9-10 O '64. (MIRA 17:12)

KUBAREV, A.I.

Determining the cost of an article in case of a change in its production schedule. Standartizatsiia 29 no.1:36-39 Ja '65.
(MIRA 18:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po normalizatsii v mashinostroyenii.

VERCHENKO, V.R.; KUBAREV, A.I.

Mathematical statistics and standardization. Standartizatsiia 29 no.7:14-16 Jl '65. (MIRA 18:11)

(A) L 11876-66 EWT(d)/EWP(c)/EWP(v)/T/EWP(k)/EWP(h)/EWP(l)/ETC(m) IJP(c)

ACC NR: AP5028744 SOURCE CODE: UR/0028/65/000/007/0014/0016

AUTHORS: Verchenko, V. R.; Kuberov, A. I.

ORG: none

TITLE: Mathematical statistics and standardization

SOURCE: Standartizatsiya, no. 7, 1965, 14-16

TOPIC TAGS: scientific standard, statistic analysis, machine industry, data sampling, quality control

ABSTRACT: The importance of statistical analysis in standardization efforts is qualitatively discussed, and an appeal is made to standardize statistical analysis methods and to expand their use in government standards. Several areas which will benefit from statistical analysis methods are listed. At present, machine part dimensions are specified with tolerances which assume all components to be at the worst maximum or minimum dimensions. Statistical analysis can show that it is very improbable that all components will have the worst error, and thus tolerances can be relaxed so as to produce major machining cost savings. The fields of quality control, reliability, and machine life prediction must use statistical analysis to obtain meaningful results. It is suggested that standards and working tables be established for sampling techniques in quality control. These should include single sampling (one sample of n out of N parts), double sampling (two samples, n_1 and n_2, taken successively out of N parts), and successive sampling (successive

Card 1/2

L 11876-66

ACC NR: AP5028744

testing of 1, 2, 3 ... 1 parts) techniques. Continuous statistical control of industrial processes can be profitably applied until these techniques are replaced by automatic control (which can also benefit from statistical analysis). The problems of specifying reliability, fatigue, and life parameters in machine parts and assemblies must be considered from a statistical standpoint to be meaningful. VNIINMASh is in the process of developing, standardizing, and publicizing various statistical techniques for these purposes.

SUB CODE: 14,13 / SUBM DATE: none

Card 2/2

(A) L 12019-66 EWT(d)/EWT(m)/EWP(w)/EWP(c)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWP(l)/
ACC NR: AP5028745 SOURCE CODE: UR/0028/65/000/007/0033/0036
ETC(m) JD/

AUTHORS: Chudakov, K. P.; Kubarev, A. I.

ORG: VNIINMASh

TITLE: Accelerated determination of reliability and life of machine parts

SOURCE: Standartizatsiya, no. 7, 1965, 33-36

TOPIC TAGS: endurance test, machine industry, fatigue test, reliability engineering, static load test, mechanical stress

ABSTRACT: Different methods for accelerated life and reliability testing are discussed qualitatively. Since it is not practical to wait 3 to 6 years to determine the reliability and wear characteristics of a given machine, accelerated tests must be performed which will give sufficient data in 3 to 6 weeks to predict the long-term behavior of machine elements. This can be achieved by either increasing the number of cycles per unit time, by intensifying the loads, or by both methods. It has been shown repeatedly that wear processes and fatigue processes can be extrapolated from limited test data with an accuracy of ± 10%. Although under industrial conditions the scatter may be as much as ± 150%, these extrapolation techniques give an excellent indication of average wear, life, and reliability. When fatigue is the life-limiting factor, the fatigue limit can be established by several increasing-load methods, such as a constant load increase to destruction, stepwise load increase to destruction, or cyclically increasing loads. Each of

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L 12019-66

ACC NR: AP5028745 O

these methods has advantages for certain applications. Determining the fatigue limit by the critical stress method is of particular interest. This method depends on the energy hypothesis of fatigue, by which it has been established that the cyclic constant and the critical number of cycles are constant for a given type of metal. No specific recommendations are made, and the article represents a very general, qualitative discussion.

SUB CODE: 14/ SUBM DATE: none

Card 2/2

30784

S/141/61/004/003/015/020
E192/E383

9,2598 (1144)

AUTHORS: Bespalov, V.I., Kubarev, A.M. and Solov'yeva L.I.

TITLE: Experimental investigation of the influence of non-homogeneities on the characteristics of some delay systems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika v. 4, no. 3 1961, pp. 534 - 546

TEXT: A theoretical investigation of the influence of non-homogeneities on the characteristics of delay systems has been reported in Ref. 1 (Radiotekhnika i elektronika 1956, 1, 772) and Ref. 2 (Dokl. Ak.nauk, 117, 209, 1957). The analysis was carried out under the assumption that the individual cells of the system could be described by means of idealised quadripoles. However, since such a description is approximate it is of interest to verify it experimentally. Consequently, an experimental investigation of the following types of delay lines was undertaken: Interdigital delay systems, metal-plate (comb-type) structures and chains consisting of a number of resonators. The interdigital system with two base surfaces is illustrated

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Experimental investigation ....

in Fig. 1. The equivalent quadripole of a cell separated by sections AA' and BB' is also shown in the figure. The matrix of this system is (Ref. 4 - A. Bloch, F.J. Fisher and G.J. Hunt - Proc. IEE, 100, 64, 1953):

$$|A| = \begin{vmatrix} \cos(k\ell) + \frac{Z}{Z'}\cos(k\ell') - \omega C_T Z \sin(k\ell) & jZ\sin(k\ell') \\ \frac{j\sin(k\ell)}{Z} + j\omega C_T \cos(k\ell) + \frac{\cos(k\ell)}{jZ'\tan(k\ell')} & \cos(k\ell) \end{vmatrix} \quad (1.1)$$

where ω is the operating frequency;

$k = \omega\sqrt{\varepsilon\mu}$;

ℓ is the length of the line sections;

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Experimental investigation ....

$1/Z' = 1/Z'_1 + 1/Z'_2$,

$Z'_1 = \sqrt{\varepsilon\mu}/C'_1$,

$Z'_2 = \sqrt{\varepsilon\mu}/C'_2$,

$Z = \sqrt{\varepsilon\mu}/C_0$ -- are wave impedances of the lines formed by a stub and the lower base surface a stub and upper base and by two neighbouring stubs respectively;

C'_1, C'_2 and C_0 are the corresponding capacitances per unit length;

C_T is the capacity between the end of a stub and the base of the opposite comb structure.

The scattering equation for a chain consisting of such quadripoles is given by:

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$$\cos\varphi_0 = \frac{A_{11} + A_{22}}{2} = \cos(k\ell)\left[1 + \frac{Z}{2Z_1} + \frac{Z}{2Z_2} \cdot \omega C_T Z \operatorname{tg}(k\ell)\right] \quad (1.2)$$

where φ_0 is the phase of the wave. The scattering characteristics were taken experimentally by using two demountable interdigital structures, consisting of similar elements. The system was designed for operation at decimetre waves and had the following dimensions: period of the system D = 10 mm; diameter of a stub s = 7 mm; length of a stub ℓ = 90 mm; the gap between the stubs h = 2 mm; the distance between the base and the stub g could be varied from 0 to 15 mm. The measured results are illustrated in Fig. 3 (small circles) together with the calculated curves (solid lines). Single discontinuities in the system were produced by using special cells in which the position of a stub could be varied. The theoretical value of the modulus of the reflection coefficient due to various types of discontinuity can be found from formulae given in Ref. 1.

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E192/E382

Experimental investigation ....

Experimentally, the following types of discontinuity were investigated: displacement of the stub in the transverse direction (g changes by Δg); changes in the gap between the stubs; displacement of the stub in the plane of the structure and changes of the length ℓ of the stub. The value of the reflection coefficient $|\Gamma|$ as a function of $\Delta g/D$ is illustrated in Fig. 4, together with the calculated curves. Comparison of the calculated and theoretical results shows that if the reflection coefficient produced by the discontinuities is small, this value can be found as a superposition of the reflection coefficients due to individual discontinuities. The equivalent circuit of a metal-plate(comb-type) structure is in the form of a chain of Γ-type quadripoles, whose matrices are in the form:

$$|A| = \begin{vmatrix} 1 & -jZ\,tg(k\ell) \\ -j\omega C & 1 - \omega CZ\,tg(k\ell) \end{vmatrix} \qquad (2.1)$$

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Experimental investigation ....

where $k = \omega \sqrt{\varepsilon\mu}$,

Z is the wave impedance of the strip line formed by the neighbouring plates and
l is the height of the plates
C is the capacitance between the end of a plate and the cover.

The phase changes of the wave over a cell are described by:

$$\cos \varphi_0 = 1 - \omega CZ \operatorname{tg}(k\ell)/2 \qquad (2.2) .$$

The experimental system investigated consisted of two metal surfaces, one of which carried a number of equidistantly-spaced metal slabs (parallelopipeds) having dimensions d = 7.2 cm, s = 1.7 cm and ℓ = 9.0 cm. The upper surface of the system was parallel to the lower surface and its distance from the metal slabs could be varied. The non-homogeneities in the system were produced by filling the gaps with metal plates, inserting pieces of metal under individual slabs or changing the spacing between the slabs. The results of the experiments are illustrated in

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Experimental investigation ....

three figures. In particular, Fig. 10 shows the value of the reflection coefficient as a function of the change of the distance between two neighbouring slabs. The straight lines of Fig. 10 were based on calculations while the circles show the experimental points. From these experiments it is seen that for small inhomogeneities, the agreement between experiment and approximate calculated results is satisfactory. On the other hand, for increasing $\Delta\ell/\ell$, $\Delta h/h$ and $\Delta b/b$, considerable deviations from the theoretical straight lines are observed. The next system to be investigated consisted of a number of rectangular resonators coupled by means of narrow slots; the system is illustrated in Fig. 12. The scattering equation of such a system is in the form

$$\cos\varphi_0 = 1 - BX/2$$

where B and X represent the series impedance and the shunting admittance of a quadripole which is equivalent to the rectangular resonator. The formula was checked experimentally by employing equipment consisting of a rectangular channel having

Experimental investigation ....

a depth of 68 mm and width of 72 mm. Transverse slots having a depth of 3 mm and width of 1 mm and spaced at 3 mm were cut at the walls and the bottom of the channel. Metal plates with small slots (irises) were inserted into these slots. The channel was then covered with a plate which had corresponding slots and small apertures for measuring the field in the resonators. The inhomogeneities in the system were produced by changing the parameters of a cell, i.e. its dimensions (d and L) and its position (a_1) . The results of the experiments illustrating the change of the natural frequency of the system are illustrated in two figures. In particular, Fig. 16 shows the frequency deviation as a function of $\Delta a/a$ and $\Delta b/b$. The straight lines in the figure were obtained theoretically. From the above results, it is concluded that the periodic delay structures can be represented by the idealised quadripoles provided the non-homogeneities are not excessive. In most practical cases, the results of experiment and theory are in satisfactory quantitative agreement.

4

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30764
S/141/61/004/003/015/020
E192/E382

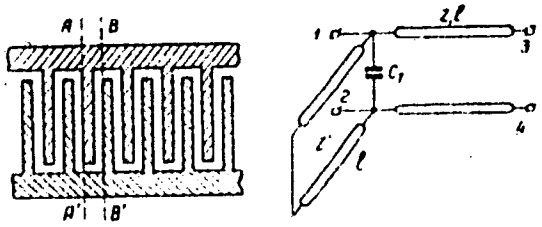
Experimental investigation ....

There are 16 figures and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc. The English-language reference quoted is: Ref. 4 - A. Bloch, F.J. Fisher and G.J. Hunt - Proc. IEE, 100, 64, 1953.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: December 15, 1960

Fig. 1:



Card 9/11

L 12471-63

S/108/63/018/004/004/008

44

AUTHORS: Bespalov, V.I. and Kubarev, A.M., Active Members of the Society

TITLE: Calculation of losses for design of circuits forming pulsations of the current in induction loads

PERIODICAL: Radiotekhnika, v. 18, no. 4, 1963, 22-30

TEXT: A system of linear algebraic equations is obtained by a method of perturbation. They permit making corrections, which are stipulated by the presence of losses in inductions of the system, to the reactive elements of the forming dipole. The reactive parameters of the circuit, forming a prescribed pulsation of the current in induction loads without losses, are assumed to be known. Coefficients for the system of equations are expressed within parameters of an ideal circuit (without loss) and within parameters of the original pulsation. This work is a continuation of that reported in reference 2: V.I. Bespalov, A.M. Kubarev, Radiotekhnika, v. 17, no. 7, 1962. The presentation considers the approximation of the pulsation with

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L 12471-63

Calculation of losses for design... S/108/63/018/004/004/008

a final total of transient harmonics, the parameters of the forming dipole, and the formation of a quasi right angled pulsation consisting of two harmonics (N=2). There are 3 figures and 4 foreign language references.

SUBMITTED: January 27, 1962

Card 2/2

ACCESSION NR: AP4019215 S/0056/64/046/002/0508/0510

AUTHORS: Kubarev, A. M.; Piskarev, V. I.

TITLE: Some results of an experimental investigation of the effect of a magnetic field on the radiation spectrum of a ruby laser

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 508-510

TOPIC TAGS: laser, ruby laser, laser in magnetic field, laser line splitting, laser frequency variation, laser cavity, axial mode, ruby laser spectrum, laser pulse modulation

ABSTRACT: A study was made of the time variation of the spectral composition of radiation from a ruby laser to which a pulsed magnetic homogeneous field was applied. The delay between the start of the field pulse and the laser flash could be varied. Splitting of the ruby emission lines was obtained at 120°K near the maximum of the magnetic field. With decreasing field the mean value of the

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ACCESSION NR: AP4019215

frequency decreased in the stronger of the two lines and increased in the weaker. The transition corresponding to the stronger line is identified as $-1/2\bar{E}(2E)\rightarrow-\bar{3}/\bar{2}(^4A_2)$, but that of the weaker is not identified. It is noted that the frequency variation is not smooth, but is changed by discrete amounts from one cavity axial mode to another. A regular decrease in the generation frequency is observed at room temperature. "The authors are deeply grateful to V. I. Bespalov and A. V. Gaponov for interest in the work and for a discussion of the results." Orig. art. has: 5 figures.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute at Gor'kiy University)

SUBMITTED: 09Aug63 DATE ACQ: 27Mar64 ENCL: 00

SUB CODE: PH NO REF SOV: 001 OTHER: 006

Card 2/2

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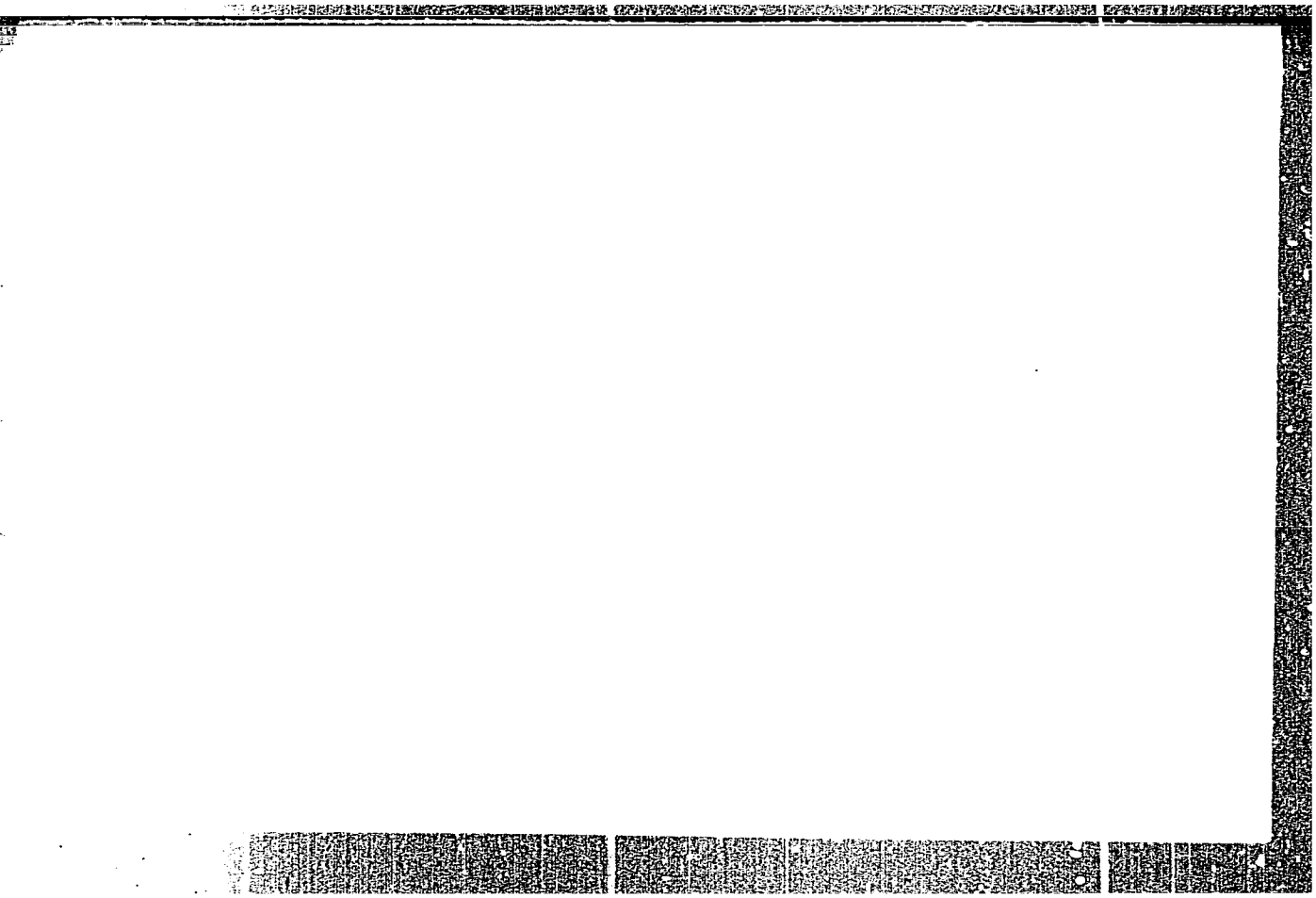

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000827010012-0"

VORONOVICH, B.M.; KUBAREV, A.T.; NACHVAY, V.F.

Ultrasonic testing of 30KhGSNA steel over a pickled surface. Defektoskopiia no. 5:84 '65 (MIRA 19:1)

1. Zlatoustovskiy metallurgicheskiy zavod i Chelyabinskiy politekhnicheskiy institut.

120-3-15/40

AUTHOR: Kubarev, A.V.

TITLE: A Sensitive Nuclear Magnetometer (Chuvstvitel'nyy yadernyy magnetometr)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, Nr 3, pp.57-60 (USSR)

ABSTRACT: A description is given of a nuclear magnetometer which can be used to measure the intensity of a constant magnetic field and its non-uniformity in the range 260-12 000 oersted with an accuracy of 0.02-0,05%. The method of resonant nuclear absorption is employed and measurement of fields having considerable non-uniformity is achieved by a reduction in the size of the specimen and an increase in the sensitivity of the recording apparatus. A special form of the specimen and a regenerating detector with capacitative coupling, as well as a narrow band amplification of the resonant signal and quartz calibration is employed. A brief description is given of the form of the specimen and the conditions and range of application. A section through the specimen is shown in Fig.3. There are 6 figures, no tables and 7 references, 2 of which are Russian, 5 English.

ASSOCIATION: Sverdlov Branch of the Scientific Research Institute for Metrology imeni D.I. Mendeleyev

Card 1/2

KURAREV, A.V., Cand Tech Sci -- (diss) "Measurement of non-homogenous magnetic fields by the method of nuclear magnetic resonance." Len, 1958, 12 pp (Committee of Standards, Measures and Measuring Devices under the Council of Ministers USSR. All-Union Sci Res Inst of Metrology im D.I. Mendeleyev) 100 copies (KL, 27-58, 113)

SOV-120-58-3-15/33

AUTHOR: Kubarev, A. V.

TITLE: Measurement of the Width of a Nuclear Absorption Line and the Gradient of a Magnetic Field using Narrow Band Amplification (Izmereniye shiriny linii yadernogo pogloshcheniya i gradiyenta magnitnogo polya pri uzkopolosnom usilenii)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 3, pp 68-70 (USSR)

ABSTRACT: In the observation of nuclear magnetic resonance it is often convenient to use narrow band amplification in order to improve the signal to noise ratio and certain other characteristics of the measuring apparatus. This was discussed in Ref.1 by the present author. The character of the signals in the case of narrow band amplification differs considerably from that obtained with wide band amplification. The formation of the signal in the channel of a narrow band amplifier is discussed in terms of harmonic analysis of the signal at the output of the resonance filter. Calculations for the case of linear modulation, in the general case of frequency variation ($f_{1,2} = \frac{\gamma}{2\pi}(H_0 \pm h_0)$ where h_0 is the modulation amplitude) in the resonance region, lead

Measurement of the Width of a Nuclear Absorption Line and the Gradient of a Magnetic Field using Narrow Band Amplification

to the following expansion coefficients:

$$a_k = \frac{U_o}{2} \frac{\sigma}{\sqrt{\pi}} \exp\left(-\frac{\pi^2 k^2 \sigma^2}{T^2}\right) \cos\frac{2\pi k\tau}{T} \; ; \; b_k = 0, \qquad (1)$$

when the signal

$$U = \frac{U_o}{2}\left[\exp(-(t-\tau)^2/\sigma^2) + \exp(-(t+\tau)^2/\sigma^2)\right]$$

is developed into a Fourier series. The above solution gives a cos distribution of signal amplitudes in the case of narrow band amplification and shows that phase changes are transformed into amplitude changes. The latter result leads to a more accurate determination of the resonance even in the case of considerable width of the resonance curve. Fig.1 shows an experimental graph of the amplitude distribution

Measurement of the Width of a Nuclear Absorption Line and the Gradient of a Magnetic Field using Narrow Band Amplification

of a nuclear absorption signal. In the case of wide sinusoidal modulation ($h_o \gg \sigma$) the resonance absorption curve may be represented by:

$$U(H) = U_o \exp(-(H_o-H)^2/\sigma^2)$$ where

$H_o = 2\pi f_o/\gamma$ and H is the field acting on the nuclear specimen. In the case of sinusoidal modulation and the resonance value of the measured field we have

$H = H_o + h_o \sin \omega_M t$ and when $h_{1,2} = H_o \pm h_o$ we have

$H = H_o \pm h_o + h_o \sin \omega_M t$. In the first case the signal amplitude at the output of the narrow band filter tuned to the frequency $\omega = 2\omega_M$ is given by:

$$U_1 = U_o \frac{2}{\sqrt{\pi}} \frac{\sigma}{h_o} \exp\left[-\left(\frac{\sigma}{h_o}\right)^2\right] \qquad (2)$$

and in the second case:

Measurement of the Width of a Nuclear Absorption Line and the Gradient of a Magnetic Field using Narrow Band Amplification

$$U_2 = U_0 \frac{1}{2\pi} \sqrt{\frac{2\sigma}{h_0}} \left[\frac{4\sigma}{h_0} \Gamma\left(\frac{3}{4}\right) - \Gamma\left(\frac{1}{4}\right) \right] =$$

$$= -U_0 \sqrt{\frac{\sigma}{h_0}} .0.816 \left(1 - 1.352 \frac{\sigma}{h_0}\right) . \qquad (3)$$

If the amplification coefficient of the filter is equal to unity then:

$$A = \left| \frac{U_1}{U_2} \right| = \frac{1.383 \sqrt{\sigma/h_0} \exp\left[- (\sigma/h_0)^2 \right]}{1 - 1.352\sigma/h_0} , \qquad (4)$$

and provided σ/h_0 is small, we have:

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Measurement of the Width of a Nuclear Absorption Line and the Gradient of a Magnetic Field using Narrow Band Amplification

$$\sigma \simeq \frac{0.26\ h_0}{A^2}\left[\sqrt{1 + 2.96\ A^2} - 1\right]^2 - 0.04 \quad . \tag{5}$$

In a non-homogeneous field

$$\sigma \simeq \sigma_0 + \sigma_H \quad , \tag{6}$$

where σ_0 is the half width of the resonance line in a homogeneous field (natural width, effect of paramagnetic ions, etc. being taken into account) and σ_H is the spread due to the fact that the field is not homogeneous and is given by:

$$\sigma_H = \frac{l}{2}\left|\text{grad } H\right| \sim \frac{l}{2}\left(\frac{\Delta H}{\Delta l}\right) \tag{7}$$

where l is the axial length of the coil containing the specimen. Thus by measuring the ratio of the amplitudes obtained with narrow band amplification at twice the

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Measurement of the Width of a Nuclear Absorption Line and the Gradient of a Magnetic Field using Narrow Band Amplification

modulation frequency one obtains the width of the resonance curve and an estimate of the gradient of the magnetic field provided $h_0 \geq |10 \div 15| \sigma$. There are 4 figures, 1 table and 2 references, of which 1 is Soviet and 1 is German.

ASSOCIATION: Sverdlovskiy filial VNII metrologii (Sverdlovsk Branch of the VNII of Metrology)

SUBMITTED: July 7, 1957.

1. Nuclear magnetic resonance---Analysis 2. Narrow band amplifiers---Applications 3. Narrow band amplifiers---Signal to noise ratio 4. Mathematics---Applications

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KUBAREV, A.V.

Errors in measurements of magnetic field intensity by the method of nuclear magnetic resonance. Izm.tekh. 20 no.1:37-39 Ja '59. (MIRA 11:12)
(Magnetic fields--Measurement) (Nuclear magnetic resonance)

82892

S/120/60/000/02/023/052

24.7900

E192/E382

AUTHORS: Kubarev, A.V. and Mezenev, Yu.A.

TITLE: Oscillator for Studying the Electron Paramagnetic Resonance

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No 2, pp 86 - 89 (USSR)

ABSTRACT: Two fundamental circuits employed in the investigation of electron paramagnetic resonance at weak magnetic fields are given in Figures 4. The first circuit is a regenerative detector with a capacitance feedback, while the second circuit is a regenerative oscillator with grid current. The performance of the two circuits is compared in Figures 1, 2 and 3. Curves marked with "1" in these figures correspond to the oscillator with grid current, while the curves marked with "2" are for the regenerative capacitance-coupled detector. From these

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graphs it is seen that the oscillator with grid current gives a much greater sensitivity than the regenerative detector. When the magnetic resonance occurs, the inductance of the test coil in the regenerative detector changes by:

$$\Delta L \simeq 4\pi (\chi' - j\chi'')\alpha L \qquad (1)$$

where α is the filling coefficient,
$\chi = \chi' - j\chi''$ represents the electron magnetic susceptibility,
χ' represents the dispersion, and
χ'' represents the damping.

The voltage change across the resonance circuit due to the resonance absorption is expressed by:

$$\Delta U = \frac{dU}{dL} \Delta L \simeq 4\pi \chi'' \alpha U_o Q \qquad (2)$$

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S/120/60/000/02/023/052
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Oscillator for Studying the Electron Paramagnetic Resonance

so that the amplitude of the absorption signal at the grid of the system is given by Eq (3), where τ is the relaxation time, $\omega_o = \gamma H_o$ is the frequency of the oscillator, γ is the gyromagnetic ratio, μ is the Bohr magneton, h is the Planck constant, g is the spectroscopic split factor and V_K is the internal volume of the test coil. The operation of the oscillator with grid current can be analysed in a similar manner. It is shown that the change of the grid current due to the resonance absorption is given by Eq (4) and the amplitude of the signal at the grid of the oscillator is expressed by:

$$\Delta U_2 = \frac{2\pi b \alpha Q^2 \omega L U_o^2 \chi_o \omega_o \tau}{1 + \pi\gamma^2 U_o^2 Q^2 \tau^2 / \omega^2 L V_K} \qquad (5)$$

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Oscillator for Studying the Electron Paramagnetic Resonance

where Q is the quality factor of the coil and
U_0 is the voltage across the resonant circuit.

The increase of the sensitivity of the oscillator with grid current with respect to the sensitivity of the regenerative detector is expressed by Eq (6). This formula is plotted in Figure 5 (the dashed line); the solid line connecting the circles in Figure 5 was taken experimentally. It is seen that the theory is in good agreement with the experiment. An electronic magnetometer for accurate measurement of weak magnetic fields was designed on the basis of the oscillator with grid current. The resulting instrument is shown in Figure 6. The device covers the frequency range from 1.35 to 40 Mc/s; the range is covered by means of three different coils. The magnitude of the capacitance C is varied from 11 - 300 pF, C_1 = 6 - 680 pF and C_2 = 3 - 240 pF. By means of this device it is possible to measure the field intensities of the order of 1 Oe with an error not exceeding 0.05%.

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S/120/60/000/02/023/052
E192/E382

Oscillator for Studying the Electron Paramagnetic Resonance

There are 6 figures and 4 references, 2 of which are English and 2 Soviet.

ASSOCIATION: Sverdlovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta metrologii
(Sverdlovsk Branch of the All-Union Scientific-Research Institute of Metrology)

SUBMITTED: February 13, 1959

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S/120/60/000/006/013/045
E032/E314

24.2300 (1395, 1482, 1543)

AUTHORS: Kuharev, A.V. and Mezenev, Yu.A.

TITLE: Apparent Change in the Gyromagnetic Ratio in a Weak Magnetic Field

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 6, pp. 52 - 53

TEXT: The electron and nuclear resonance absorption methods are being widely used in various studies, in particular, in precision measurements of magnetic fields. In the latter case, use is made of the proportionality between the resonance frequency of high-frequency oscillations ω_{res}, which is equal to the precession frequency ω_o, and the intensity of the magnetic field H_o, which is expressed by:

$$\omega_{res} = \omega_o = \gamma H_o \qquad (1)$$

where γ is the gyromagnetic ratio. In the case of electron resonance, $\gamma_э = g\mu_o/\hbar$, where μ_o is the Bohr magneton, and

S/120/60/000/006/013/045
E032/E314

Apparent Change in the Gyromagnetic Ratio in a Weak Magnetic Field

g is the spectroscopic splitting factor ($g \approx 2$) . In the case of nuclear resonance, $\gamma_n = \mu\mu_n/I\hbar$, where μ is the magnetic moment of the nucleus in nuclear magnetons, μ_n is the nuclear magneton and I is the spin of the nucleus. In a strong field Eq. (1) is satisfied to a very high degree of accuracy. However, in the case of weak field, the use of Eq. (1) leads to a systematic error which increases with decreasing magnetic field. This error is due to the fact that Eq. (1) does not strictly hold for fields which are comparable with the width of the resonance curve. In such cases, the frequency of the high-frequency oscillations corresponding to the maximum of the resonance signal is not equal to the frequency determined by the resonance condition. This leads to an "apparent" change in γ or g for the specimen, or alternatively, to a change in the form of the resonance condition. The average high-frequency energy absorbed by the

Apparent Change in the Gyromagnetic Ratio in a Weak Magnetic Field

specimen from the exciting coil may be written down in the form:

$$P(\omega) = \omega H_1^2 \chi''(\omega) \qquad (2) .$$

For a circularly polarised high-frequency field in the case of the electron spin resonance in the absence of saturation, it is known that the component of the complex susceptibility corresponding to absorption is given by:

$$\chi''(\omega) = \frac{\chi_o \omega \Delta\omega}{\Delta\omega^2 + (\omega_o - \omega)^2} \qquad (3)$$

where $\Delta\omega = \gamma\sigma$ is the half-width of the resonance curve in units of frequency and σ is the half-width of the curve in units of the field. Substituting Eq. (3) into Eq. (2), we

Apparent Change in the Gyromagnetic Ratio in a Weak Magnetic Field

obtain an expression for the absorption curve in terms of frequency, and hence it can be shown that the value of the frequency corresponding to the maximum of this curve in the case of a weak field is given by:

$$\omega_{res} = \omega_o + \Delta\omega^2/\omega_o \qquad (4) .$$

In a strong field the first term of this expression can be neglected. Using the relations for ω, $\Delta\omega$, γ and g, it can be shown that the apparent values of ω and g in a weak field are given by:

$$\gamma' = \gamma + \gamma\sigma^2/H_o^2; \quad g' = g + g\sigma^2/H_o^2 \qquad (5) .$$

The dependence of the g' factor on the field H_o was determined experimentally by the present authors in the case

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of the electron spin resonance for a specimen of the free radical of αα-diphenyl β-picrylhydrazine in fields down to 0.04 Oe, when the magnitude of the g'-factor increased up to about 34. The experimental curve for g as a function of H_o is shown in the figure on p. 53. The half-width of the resonance curve for a specimen containing 95% of the above free radical is 0.85 Oe and the magnitude of the g-factor in the strong field is 2.0042. The observed functional dependence is in agreement with Eq. (5) if the second term is corrected by a constant factor of π^{-2}. It is clear that this effect must be taken into account in nuclear magnetic resonance studies in fields of the order of the Earth's field. In the case of electron spin resonance, when the width of the resonance curve is usually appreciable, the apparent increase in the g-factor is already important at fields of 1 Oe or less.

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S/120/60/000/006/013/045
E032/E314

Apparent Change in the Gyromagnetic Ratio in a Weak Magnetic Field

There are 1 figure and 1 English reference.

ASSOCIATION: Sverdlovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta metrologii (Sverdlovsk Branch of the All-Union Scientific Research Institute of Metrology)

SUBMITTED: November 16, 1959

Card 6/6

KUBAREV, A.V.

Calibrating electronic paramagnetic resonance pickups for magnetometry. Izm.tekh. no.9:43-46 S '62. (MIRA 15:11)
(Magnetic fields—Measurement) (Calibration)

KUBAREV, A.V.

Quantum radiophysics and metrology. Izm. tekh. no.10:5-7 O '63.
(MIRA 16:12)

ACCESSION NR: AP4041344 S/0115/64/000/005/0025/0029

AUTHOR: Khinrikus, Kh. V.; Kubarev, A. V.

TITLE: Fundamental characteristics of quantum paramagnetic amplifiers

SOURCE: Izmeritel'naya tekhnika, no. 5, 1964, 25-29

TOPIC TAGS: amplifier, maser, quantum paramagnetic amplifier, resonator paramagnetic amplifier, traveling wave paramagnetic amplifier

ABSTRACT: These characteristics of the quantum paramagnetic amplifier -- both resonator type and traveling-wave type -- are regarded as fundamental: frequency band, gain, passband, input noise temperature, saturation power, gain instability, and unilateralization (internal feedback). The recovery time and amplifier loss are measurable special characteristics. A third group of characteristics, single-valuedly determined by some of the above characteristics, includes: paramagnetic gain, resonator-amplifier efficiency, sensitivity, and

Card: 1/2

ACCESSION NR: AP4041344

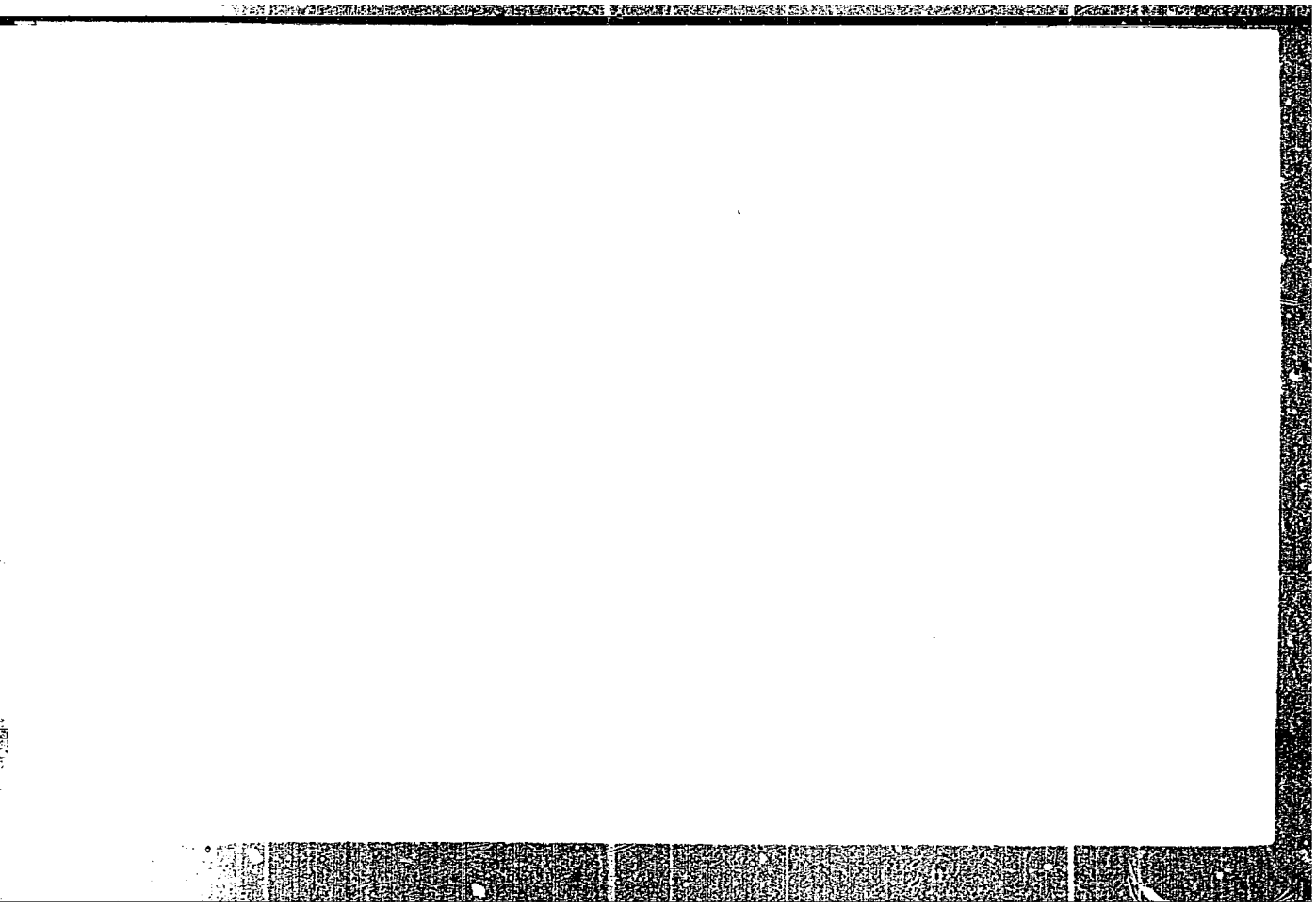
dynamic range. Formulas describing the fundamental characteristics based on published (mostly American) sources are given. Orig. art. has: 28 formulas.

ASSOCIATION: none

SUBMITTED: 00 ATD PRESS: 3074 ENCL: 00

SUB CODE: EC NO REF SOV: 003 OTHER: 012

Card 2/2



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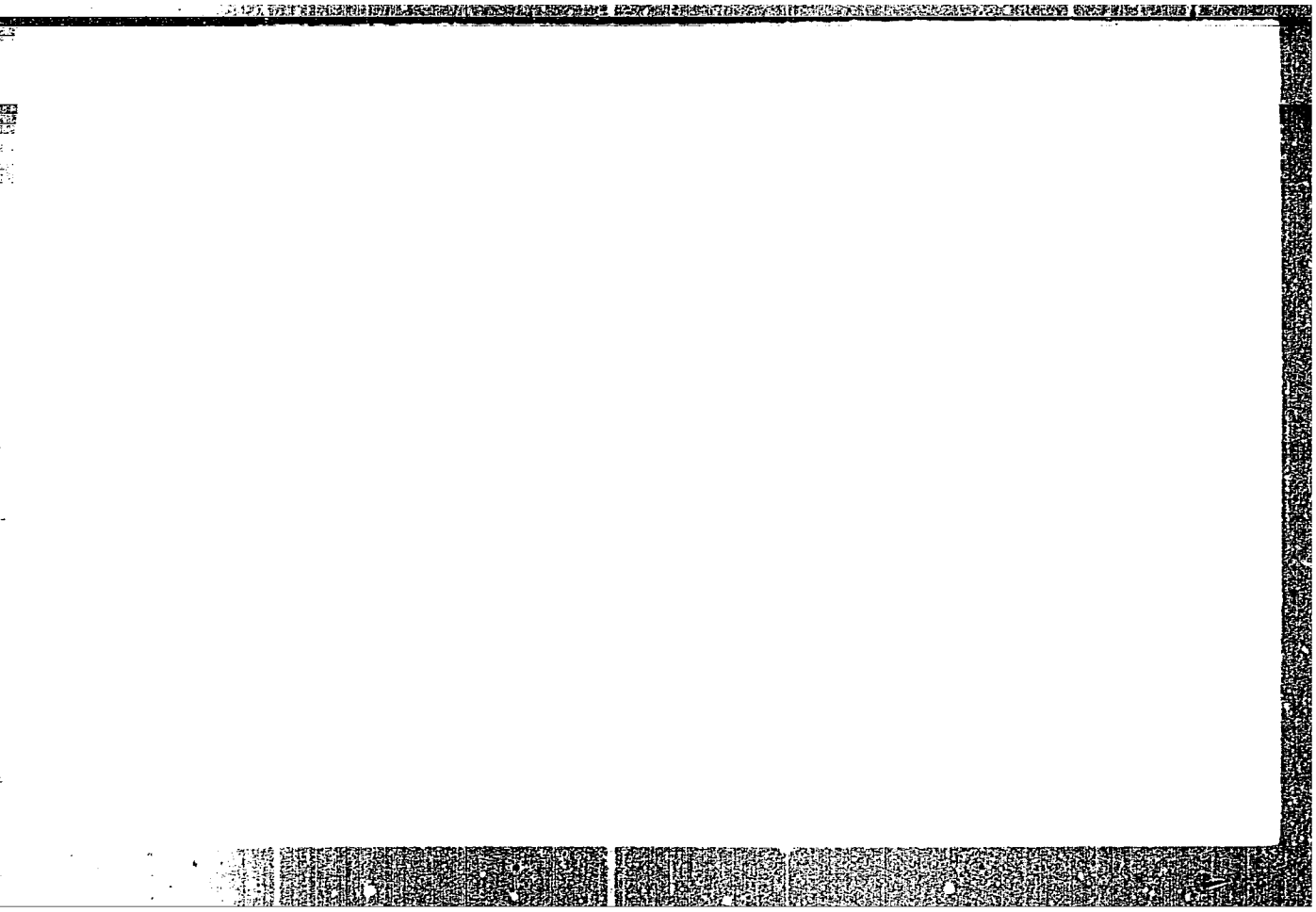

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000827010012-0"

LESKOV, A.S.; KUBAREV, A.V.

Absolute measurement of the numbers of stable paramagnetic centers. Izm. tekh. no.5:27-29 My '65. (MIRA 18:8)

ZUSSER, A.P., inzh.; LAZEBNIKOV, M.B.; KUBAREV, G.N.

Using tipping forms in making precast reinforced concrete fences [Suggested by A.P.Zusser, M.B.Lazebnikov, G.N.Kubarev] Rats. i izobr. predl. v stroi. no.6:30-32 '58. (MIRA 11:10)
(Fences) (Concrete construction--Formwork)

PANASENKO, Vasiliy Grigor'yevich; KUBAREV, K.P., retsenzent; ZAVATSKIY, M.A., retsenzent; SVIRIDOV, N.P., retsenzent; KHABAROV, L.N., retsenzent; NIKIFOROV, A.S., red.

[Study of materials used in carpentry and furniture manufacture] Materialovedenie stoliarno-mebel'nykh proizvodstv. Moskva, Lesnaia promyshlennost', 1964. 204 p. (MIRA 18:3)

Eczema

Treatment of eczema by intravenous novocaine injections. Vest. ven. i derm. No. 4, 1952.

Monthly List of Russian Accessions, Library of Congress, November 1952. UNCLASSIFIED

[redacted], A. V. [redacted].

"Intravenous Administration of Novocaine in the Treatment of Eczema."

Vestnik venerologii i dermatologii (Bulletin of Venerology, Dermatology), No 1, January-February 1951 (bimonthly), Moscow.

[redacted], M. . Docent ; ZHIV, M. A. Docent

"Novocaine Blockade and its Variations in the Treatment of Eczema."

Vestnik venerologii i dermatologii (Bulletin of Venerology Dermatology), No 1 January-February 1954 (biomer), Moscow.

Kubarev, M.V.

ZENIN, A.S.; KUBAREV, M.V.

Treatment of eczema with intravenous procaine. Vest. vener., Moskva no. 4:15-16 July-Aug. 1952. (CLML 23:3)

1. Professor for Zenin; Docent for Kubarev. 2. Of the Skin-Venerological Clinic (Head — Prof. A. S. Zenin), Kuybyshev Medical Institute.

In treating eczema, intravenous injection of novocain together with the necessary local treatment can accelerate the healing of acute inflammatory symptoms such as itching, and improves the sleep and the condition of the patient in general. In chronic eczema, novocain which infiltrates the skin is not usually resorbed. No marked effects of the novocain treatment on acute inflammatory processes was observed.

KUBAHNV, M.V., dotsent; D'YACHKOV, D.T.

Prevention of pyodermitis in workers employed by the machine-building industry. Vest. ven. i derm 30 no.1:23-25 Ja-F '56 (MLRA 9:4)

1. Iz kliniki kozhnykh i venericheskikh bolezney Kuybyshevskogo meditsinskogo instituta (zav. kafedroy-prof. A.S. Zenin) i mediko-sanitarnoy chasti (nach. M.Ye. Poltoratskaya)

(SKIN DIS, dis. Pyoderma, prev. and control
piodermitis, prev. in indust. workers)
(INDUSTRIAL HYGIENE
pyoderma
prev. of piodermitis in workers)

KOLESNIKOV, Vasiliy Pavlovich; KUBAREV, Nikolay Vlasovich; AVDEYEV, Boris Ivanovich; KUDIKINA, Ye., red.; GUTMAN, A., tekhn. red.

[Advanced technological processes in the machinery industry] Progressivnye tekhnologicheskie protsessy v mashinostroenii. Kaliningrad, Kaliningradskoe knizhnoe izd-vo, 1962. 110 p. (MIRA 15:11)
(Machinery industry--Technological innovations)

KUBAREV, P.I.

Additional artificial pollination of self-pollinators. Bot.; issl. Bel. otd. VBO no.5:192-195 '63. (MIRA 17:5)

KUBAREV, P.I.

Additional artificial pollination of winter wheat. Agrobiologiia no.1:110-111 Ja-F '63. (MIRA 16:5)

1. Polesskaya sel'skokhozyaystvennaya opytnaya stantsiya.
(Fertilization of plants) (Wheat)

KUBAREV, P.I.

Differences in the nucleic acid content between the male and female inflorescences of corn. Fiziol.rast. 12 no.6:968-970 N-D '65. (MIRA 18:12)

1. Leningradskiy sel'skokhozyaystvennyy institut. Submitted February 1, 1965.

KUBAREV, G. I. and SOKOLOV, N. D.

"On the Theory of Dependence of Molecular Spectra on Intermolecular Interaction."

report presented at the 4th International Meeting of Molecular Spectroscopy, Bologna, Italy, 7-12 Sept 1959.

Moscow State University, Moscow, USSR.

24 (7)
AUTHOR: Kubarev, S. I. SOV/20-126-5-16/69

TITLE: On the Influence Exerted by Intermolecular Interaction Upon the Spectra of Molecules (O vliyanii mezhmolekulyarnykh vzaimodeystviy na spektry molekul)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 971 - 974 (USSR)

ABSTRACT: Intermolecular interaction produces a number of spectroscopic effects, the most important of which consists in the broadening and shift of lines. These are visible both in absorption and Raman spectra. In the case of van der Waals' interaction they are comparatively weak, in systems with H- or Li-bonds, however, they are so strong that they may be considered characteristic features of these compounds. The existence of a broad and shifted band of the O-H group, for example, indicates the formation of a hydrogen bridge. The distribution of intensity within the bands greatly depends on temperature. No unambiguous and uniform explanation of the spectroscopic effects as a whole (shift, broadening, temperature dependence in systems with hydrogen bonds) has been found as yet. One of the greatest difficulties arises from the fact that not only in condensed but also

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in gaseous media broad bands are visible. The author of this article made an attempt to give a general explanation of any state by Lax' method (Ref 3). Mathematical considerations of the absorption and Raman spectra are made in semi-classical adiabatic approximation. The results are briefly discussed. The author finally thanks Professor N. D. Sokolov for his discussions. There are 6 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: March 11, 1959, by V. N. Kondrat'yev, Academician

SUBMITTED: March 6, 1959

Kuharev, S.I.

31913

24.6200

S/051/60/009/01/001/031
E201/E691

AUTHOR: Kuharev, S.I.

TITLE: On Certain Problems in the Spectroscopy of Complex Molecules 21

PERIODICAL: Optika i spektroskopiya, 1960, Vol 9, Nr 1, pp 3-6 (USSR)

ABSTRACT: Neporent and Stepanov (Ref 1) defined a complex molecule as a multiatomic molecule in which the degree of coupling between normal vibrations is sufficient to produce continuous vibrational-energy bands. The present author points out the approximate nature of such a definition and then uses it to discuss the origin of continuous bands of complex molecules. It is shown that the use of the oscillator approximation explains satisfactorily the experimentally observed temperature dependence of the band parameters (e.g. width) of complex molecules. The paper is entirely theoretical. Acknowledgments are made to N.D. Sokolov for his advice. There are 10 references, 8 of which are Soviet, 1 English and 1 Japanese.

SUBMITTED: July 18, 1959

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85236

S/048/60/024/006/029/030/XX
B013/B067

24.6100

AUTHOR: Kubarev, S. I.

TITLE: Electron Spectra of Compound Molecules

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 6, pp. 775 - 778

TEXT: In this paper, the author demonstrates that in the majority of compound molecules the principal spectrometric effects can be studied on the basis of Lax's relations (1). This method is based on the following consideration: As has been shown already in Ref. 1, adiabatic approximation can be used for the long-wave electron absorption of compound molecules. If the application of adiabatic approximation is justified, i.e., if a vibrational subsystem exists for several lower electron states, the problems of absorption and emission of light can be considered from one point of view. In this case, the spectral absorption and emission densities can be represented in a convenient form by using the method of Lax (Ref.2):

$$I(\nu) = \int \exp(-2\pi i \nu t) I(t) dt,$$

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Electron Spectra of Compound Molecules

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B013/B067

where the Fourier representations of the spectral absorption and emission densities read as follows:

$$\left.\begin{aligned} I_{\substack{\text{absorb}\\(a \to b)}}(t) &= \frac{Sp\left\{M^{*}\exp\left[(it/\hbar)\hat{H}_b\right] M \exp\left[(-it/\hbar)\hat{H}_a\right]\exp\left(-\beta\hat{H}_a\right)\right\}}{Sp\left[\exp\left(-\beta\hat{H}_a\right)\right]} \\ I_{\substack{\text{emiss}\\(b \to a)}}(t) &= \frac{Sp\left\{M \exp\left[(-it/\hbar)\hat{H}_a\right] M^{*}\exp\left[(it/\hbar)\hat{H}_b\right]\rho\right\}}{Sp\,(\rho)} \end{aligned}\right\} \quad (1)$$

ρ- distribution function of the vibrational states in excitation; $\hat{H}_a$ and $\hat{H}_b$ vibrational Hamiltonians for the electron states a and b; M - transition moment. The author demonstrates the applicability of the method suggested by some examples, considering the formation of continuous bands, their shape, and the mirror symmetry of absorption

Electron Spectra of Compound Molecules

S/048/60/024/006/029/030/XX
B013/B067

and emission spectra. Finally, he suggests the possibility of drawing qualitative, and in some cases also semiqualitative, conclusions as to some other problems by using the suggested method as, e.g., the temperature dependence of the bands, the temperature dependence of the luminescence quantum yield, the effect of solvents on molecular spectra, etc. S. I. Vavilov is mentioned. The present paper was read at the Eighth Conference on Luminescence (Molecular Luminescence and Luminescence Analysis) which took place in Minsk from October 19 to 24, 1959. There are 7 references: 6 Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

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5(4)

AUTHOR: Kubarev, S.I.

S/020/60/130/05/031/061
B004/B014

TITLE: Light Absorption and Luminescence of Complex Molecules

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 5, pp 1067-1070 (USSR)

ABSTRACT: The author describes a mathematical method used to solve the following theoretical problems of long-wave electron spectroscopy: the origin of the bands, their universal character (S.I. Vavilov, Ref 1), their dependence on temperature and λ_{exoit}, and the problem of mirror symmetry. According to M. Lax (Ref 5), the author derives equations (1) in adiabatic approximation for the Fourier transformation of the spectral density of absorption and emission. The general form of these equations permits various approximations. A blurring of spectral lines of the order of some 100 cm^{-1} is thus calculated by a semiclassical study of the degrees of freedom which correspond to conditions (2) and (3). In the case of complex molecules this blurring is sufficient for the development of a band. Another explanation of the bands proceeds from the action of

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the peripheral groups of complex molecules. The universal nature of the bands is explained by the central limit theorem (Ref 12) according to which the distribution of the normalized quantity $q = (\nu - \overline{\nu})\sigma$ with $n \to \infty$ tends to the normal function ($\overline{\nu}$ = position of the maximum, σ^2 = second moments, $n = n_i \cdot \overline{n}_i$, where n_i denotes the number of oscillators with the frequency i, $\overline{n}_i$ the average according to Planck. The temperature dependence is determined by calculating several first moments or the traces of equations (1). For mirror symmetry some solutions are obtained from equations (1), one of which may be regarded as the development of V.L. Levshin's condition. An equation (14) is written down for the symmetry line λ_s, which indicates that the frequency of electron transition is shifted toward the absorption maximum in accordance with experimental results (Ref 16). The author thanks Professor N.D. Sokolov for his valuable advice. There are 16 references, 14 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

Light Absorption and Luminescence of Complex Molecules

S/020/60/130/05/031/061
B004/B014

PRESENTED: October 10, 1959, by V.N. Kondrat'yev, Academician

SUBMITTED: October 7, 1959

Card 3/3

KUBAREV, S. I.

Cand Phys-Math Sci, Diss -- "Certain problems on the spectroscopy of complex molecules". Minsk, 1961. 13 pp, 21 cm (Acad of Sci BSSR. Joint Council of the Inst of Physics, Inst of Math and Computer Engr and the Dept of Solid State and Semiconductor Physics, Acad of Sci BSSR), 180 copies, No charge (KL, No 9, 1961, p 175, No 24252).
/61-54879/

KUBAREV, S.I.

Influence of vibrations on the limiting luminescence polarization of conplex molecules. Opt. i spektr. 10 no.4:535-537 Ap '61.
(MIRA 14:3)

(Luminescence)

L 18090-63 EWT(1)/FCC(w)/BDS AFFTC/ASD/LJP(C)
ACCESSION NR: AT3002187 S/2941/63/001/000/0003/0008

AUTHOR: Kubarev, S. I. 53

TITLE: One-dimensional model for absorption and emission calculations of complex molecules

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya. Moscow, Izd-vo AN SSSR, 1963, 3-8

TOPIC TAGS: absorption band, emission band, complex molecule, quantum mechanics, Stokes-lines, half-width

ABSTRACT: The author has discussed the application of the one-dimensional model to determine the spectroscopic characteristics of complex molecules. It is shown that although it is not a very rigorous method, the one-dimensional model is useful in presenting approximate methods to solve problems relating to absorption and emission bands in complexly structured molecules. A formal application of such a model is the semiclassical approximation which is a moment expansion technique with Hamiltonians given in Bose operators. The author notes that in all one-dimensional calculations the choice of the particular expansion

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parameter implicitly assumes a temperature of the order of 3000K. Furthermore, the one-dimensional quantum mechanical model gives rise to a large discrepancy between the half-width (of the frequency spectrum curve) and the Stokes-shift. Orig. art. has: 14 formulas and 1 table.

ASSOCIATION: none

SUBMITTED: 16Mar62 DATE ACQ: 19May63 ENCL: 00

SUB CODE: PH NO REF SOV: 007 OTHER: 006

L 00938-66 EWT(1)/EPA(s)-2/EWT(m)/EPF(c)/EWP(j)/T/EWA(h) IJP(c) AT/RM

ACCESSION NR: AP5019731 UR/0379/65/001/002/0229/0241 42 39 12

AUTHOR: Kubarev, S.I.; Mikhaylov, I.D. 44,55 44,55

TITLE: Calculation of kinetic coefficients for certain organic semiconductors 15, 44,55 21

SOURCE: Teoreticheskaya i eksperimental'naya khimiya, v. 1, no. 2, 1965, 229-241

TOPIC TAGS: organic semiconductor, electron mobility, anthracene, naphthalene, electric conductivity, band theory

ABSTRACT: An approximate solution is derived for the kinetic equation for semiconductors with a narrow conduction band (such as naphthalene and anthracene). On the basis of this solution, certain kinetic coefficients were calculated. The contribution of transfer processes into the relaxation time was taken into account. A numerical estimate of this contribution for the electrical conductivity shows that when transfer processes are considered, the conductivity decreases approximately by a factor of two. The temperature dependence of the mobility obtained agrees qualitatively with the experimental data, which lead to a relation of the type $\mu \sim \frac{1}{T^{\alpha}}$; $1 < \alpha < 2$. Using the approximation under consideration, a very

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L 00938-66

ACCESSION NR: AP5019731

simple formula was obtained for the thermoemf:

$$Q = \frac{\varepsilon_{ent}}{eT},$$

but the lack of experimental data on the temperature dependence of the thermoemf did not permit a comparison with the experiment. It is concluded that the kinetic equation is applicable when $\varkappa \gtrsim 1$ cm^2/sec. Orig. art. has: 4 figures and 54 equations.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR, Moscow (Institute of Chemical Physics, AN SSSR).

SUBMITTED: 26Oct64 ENCL: 00 SUB CODE: SS, OC

NO REF SOV: 001 OTHER: 006

Card 2/2

KUBAREV, G.I.; MIKHAYLOV, I.D.

Computation of kinetic coefficients for certain organic semiconductors. Part 2: Computation of magnetoresistance and Hall constant. Teoret. i eksper. khim. 1 no.4:488-493 '65.
(MIRA 18:10)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

KUBAREV, S.I.; SHCHEGRIN, M.I.

Use of diagram techniques for computing the electroconductivity tensor. Teoret. i eksper. khim. 1 no.4:494-504 '65.
(MIRA 18:10)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

L 15532-66 EWT(1) IJP(c)

ACC NR: AP5025857 SOURCE CODE: UR/0020/65/164/004/0778/0781

AUTHOR: Kubarev, S. I.

ORG: Institute of Chemical Physics, Academy of Sciences SSSR (Institut khimicheskoy fiziki Akademii nauk SSSR)

TITLE: Semiclassical approximation in the theory of electrical conductivity

SOURCE: AN SSSR. Doklady, v. 164, no. 4, 1965, 778-781

TOPIC TAGS: electric conductivity, Boltzman equation, correlation function, approximation method

ABSTRACT: The evaluation of transfer coefficients by establishing the appropriate kinetic equation cannot be justified in all the cases of interest. For instance, in the case of organic semiconductors with an experimentally determined mobility $u < 10^{-2}$ cm^2/V·sec the calculation of the transfer coefficient on the basis of Boltzman type kinetic equations can hardly be carried out. Consequently, in such cases it is expedient to start with expressions which relate the characteristics of the nonequilibrium state with the correlation functions of the statistical equilibrium conditions. Starting from a system described by the Hamiltonian

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L 15532-66

ACC NR: AP5025857

(Y. Toyozawa, Progr. Theor. Phys., 26, 1, 29, 1961)

$$H = \sum(\epsilon - \mu)\, a_m^+ a_m + \sum B(g)\, a_{m+g}^+ a_m +$$
$$+ \sum A_q e^{iqm}(b_q + b_{-q}^+)\, a_m^+ a_m + \sum \omega_q b_q^+ b_q;$$
$$H = H_0 + H_1; \quad H_1 = \sum A_q e^{iqm}(b_q + b_{-q}^+)\, a_m^+ a_m;$$

(μ - chemical potential), the present author develops a special approximation which holds true precisely for conditions which bar the use of the ordinary kinetic equation and which reduce the correlation function to a simple approximation. In this approximation, the first semiclassical moments always agree with the corresponding first exact moments; the second moments are in agreement only in the $S(i\beta) = 1$ approximation ($S(t) = e^{iH_0t}e^{-iHt} \approx e^{-iH_1t}$). The paper was presented by Academician V. N. Kondrat'yev, 15 March 1965. Orig. art. has: 20 formulas.

SUB CODE: 20,12 / SUBM DATE: 05Mar65 / ORIG REF: 004 / OTH REF: 006

Card 2/2

L 29136-66 EWP(j)/EWT(m) IJP(c) RM

ACC NR: AP6018674 SOURCE CODE: UR/0379/65/001/004/0488/0493

35
B

AUTHOR: Kubarev, S. I.; Mikhaylov, I. D.

ORG: Institute of Chemical Physics, AN SSSR, Moscow (Institut khimicheskoy fiziki AN SSSR)

15

TITLE: Calculation of the kinetic coefficients for some organic semiconductors. II. Calculation of magnetic resistance and Hall constant

SOURCE: Teoreticheskaya i eksperimental'naya khimiya, v. 1, no. 4, 1965, 488-493

TOPIC TAGS: organic semiconductor, approximation, anthracene

ABSTRACT: The Hall constant, magnetic resistance and Hall motion for a certain class of organic semiconductors are calculated on the basis of the approximation solution of the kinetic equation for the case of narrow energy zones, derived earlier by the authors (see TEKh, No 1, 1965, p 229). A comparison with the experiment for the case of phthalocyanine indicates that the scheme developed is in satisfactory agreement with the experimental data. Certain values for anthracene, pyrene, free phthalocyanine, and copper phthalocyanine are presented in a table, some of which were taken from the literature while others were derived from the present efforts or in the previous work of the authors. Orig. art. has: 30 formulas, 1 table.

SUB CODE: 20 / SUBM DATE: 10Dec64 / ORIG REF: 002 / OTH REF: 005 [JPRS]

Card 1/1

ACC NR: AP6032978 SOURCE CODE: UR/0379/66/002/004/0486/0493

AUTHOR: Kubarev, S. I.

ORG: Institute of Chemical Physics, AN SSSR, Moscow (Institut khimicheskoy fiziki AN SSSR)

TITLE: Theory of kinetic transfer coefficients in organic semiconductors. Part 1: Electric conductivity of an electron-phonon system

SOURCE: Teoreticheskaya i eksperimental'naya khimiya, v. 2, no. 4, 1966, 486-493

TOPIC TAGS: semiconductor conductivity, phonon, electron

ABSTRACT: A generalization of the approximation of short times is discussed for an electron-phonon system characterized by a sufficiently narrow conduction band. As a result, in contrast to the semiclassical approximation, an analytical expression is obtained for the generating function of semi-invariants. Edgeworth's expansion is used as the interpolation formula for the electric conductivity tensor. More rigorous criteria of the applicability of the semiclassical approximation are derived in the high-temperature approximation. A calculation of the temperature corrections to the generating function is carried out. Preliminary estimates show that the generating function thus refined can have meaning down to temperatures much below room temperature. Orig. art. has: 35 formulas.

SUB CODE: 20/ SUBM DATE: 26Jun65/ ORIG REF: 006/ OTH REF: 011

Card 1/1

AUTHOR: Kubarev, V.I., Engineer SOV/122-58-6-31/37

TITLE: Development Prospects in Power Plant Machinery Manufacture
(O perspektivakh razvitiya energomashinostroyeniya)

PERIODICAL: Vestnik Mashinostroyeniya, 1958, Nr 6, pp 76-79 (USSR)

ABSTRACT: The author summarises the information and views advanced recently at the branch conference on power-generating plant convened in Leningrad by the mechanical-engineering division of Otdel mashinostroyeniya Gosplana SSSR (State Planning Commission of the USSR). In 1957, the amount of electrical energy produced was 4.3 times that in 1940. 80% was generated by thermal power stations. Following the guidance of the State authorities, development towards higher steam conditions, more integrated automation of power-station plant, the introduction of boiler-turbine block units, including those of 200 and 300 MW, the batch production of stationary and traction gas turbine plants and of portable gas turbine power stations have been pursued. The production of steam turbines between 25 and 100 MW for steam conditions of 90 atm and 535 °C and of suitable boilers has been set up. Steam turbines of 150 MW for steam conditions of 170 atm. and 550/570 °C

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with intermediate re-heat to 520 °C and suitable boilers with natural circulation and an output of 240 t/h have been built and put into normal service. The development of electronic systems for the automatic regulating of large boiler units has been accomplished. The Kuybyshev hydro-electric power station containing the most powerful hydraulic turbines in the world with variable pitch blades was commissioned. In 1957, the first four units for the Stalingrad hydro-electric station were assembled. At the Shatsk underground coal gasification station, a gas turbine installation of 12 000 kW is being put into service. The first prototypes of a power-generating gas turbine plant of 6 000 kW for operation with blast-furnace gas have been made with a turbine inlet temperature of 600 °C. Gas-turbine plants of 4 000 kW have also been built with an inlet temperature of 700 °C to drive the pumping stations of trunk gas pipelines. Gas turbine plants of 4 000 to 6 000 kW for traction purposes are under construction. The first steam turbine of 50 MW with steam conditions of 130 atm and 565 °C with two controllable steam extractions and condensing steam turbines of 150 and 200 MW with the same

steam conditions and intermediate re-heat to 565 °C have been produced. These turbines were constructed solely of pearlitic steels. A forced-circulation boiler of 640 t/h (to serve the 200 MW turbine) has been made and a boiler with natural circulation and an output of 500 t/h (to serve the 150 MW turbine) is under construction. More than 25 types of steam turbines of low and medium power have been created. A super-imposed steam turbine of 100 MW and a condensing turbine of 300 MW with initial steam conditions of 300 atm and 650 °C are being designed. The steam inlet pipes and high-pressure parts of these turbines will be made of austenitic steels. Project work is proceeding on 50 and 100 MW back-pressure steam turbines for district heating stations, and on gas-turbine plants of 12, 25 and 50 MW. The design of a single shaft radial-axial hydraulic turbine, 204 MW, for the Bratsk hydro-electric power station is being completed and project work is proceeding on a 300 MW hydraulic turbine for the Krasnoyarsk hydro-electric power station. Designs are available for over 26 types of small and medium power steam

turbines, including boiler-turbine block units of 750 and 1 500 kW. Research on new steels and their fabrication is under way. This work has made it possible to produce prototypes of steam boilers and turbines for up to 570 °C and of gas turbines of up to 700 °C inlet temperature. The preliminary prediction of power generation in the USSR in 15 years is 800 billion kWh/annum. The additional installed capacity will be primarily based on thermal power generation. During 1959-1965, regional thermal power stations of up to 3 400 MW, powerful district heating stations to supply cities and industrial enterprises with heat, large hydro-electric power stations for the generation of cheap electric power with the minimum personnel and the wide use of natural gas for regional power stations and industrial heating will be the main trends of construction. Natural gas achieves a substantial reduction (by 20%) in the capital cost of power stations. In 1965, natural gas will be responsible for up to 15% of the total generation. Power generating and direct driving gas turbine plants will find wide use in industry. The need exists for a pronounced improvement

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in boiler and turbine plants and for lengthening their service life between overhauls. The basic equipment for large thermal power stations will be back-pressure steam turbines of 50 and 100 MW with controllable steam extraction and condensing turbines of PVK type rated 100, 150 and 200 MW, working with initial steam conditions of 130 atm and 565 °C and intermediate re-heat; furthermore, condensing turbines of PSVK-type rated 300 and 600 MW with initial steam conditions of 240, 80 and 580 °C and intermediate re-heat. Units of up to 300 MW will be made as single-shaft units. Superimposed turbines of SKR-type rated 100 MW and condensing turbines of SKK-type of 300 and 600 MW with initial steam conditions of 300 atm and 650 °C and over are foreseen. About 1965, the proportion of steam turbines made for steam conditions of 130 atm and 565 °C will be 40% and of those with steam conditions of 240 atm and 580 °C will be 30% of the total. The manufacture of turbines for 90 atm and 565 °C will drop to 20% of the total. During 1959-65, back-pressure steam turbines will constitute 20-25% of the total manufacturing programme of steam turbines. Turbines with steam conditions

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of 240 atm and 580 °C will be constructed solely of pearlitic steels. Their economy will be no lower than that of turbines made with austenitic steels for initial steam conditions of 220 atm and 600 °C. The increase of unit rating and the use of higher steam conditions will reduce the specific cost of the plant, save metal and increase the power output of turbines built with existing manufacturing facilities. According to calculations of the Khar'kovskiy turbinnyy zavod (Kharkov Turbine Plant) the specific consumption of metal in turbines of 600 MW is 2.5 times less than that in turbines of 150 MW. In the new steam turbines, improved designs of the inlet stages, improved rotor and stator blades and several methods of steam-cooling of the inlet parts of the turbine will be applied. New methods of moisture removal from the last stages of the turbines will be developed. Compared with a turbine of the VK-100-2 type, the efficiency of a VKT-100 type turbine will be higher by 6.5%, that of the PVK-150 turbine by 14,5%, that of the PSVK-300 turbine by 19% and that of the SKK-300 turbine by 24%.
The specific heat consumption of PSVK-300 turbines will,

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according to the LMZ (Leningrad Metal Works) data, amount to about 1 900 kcal/kWh and that for the SKK-300 turbine (according to the Khar'kov Turbine Plant) will amount to 1 720 kcal/kWh. The boiler-turbine block system will be applied in most power stations with fully automated units in sizes of 200, 300 and 600 MW. Improved reliability of the new equipment is postulated in the change-over to the block system. Boilers with steam conditions of 140 atm and 570 °C and with the super-critical conditions of 250 atm and 585 °C will be increasingly used in 1959-65. Several powerful boiler units with 315 atm and 655 °C will be made. The proportion of 140 atm and 570 °C boilers with outputs of 210, 420 and 640 t/h will reach 40% in 1965 and of boilers for 250 atm and 585 °C and over will reach 23%. The output of single-boiler plants will reach 1 650 - 1 800 t/h (to serve turbines of 600 MW). The proportion of boilers for 100 atm and below will drop from 63% to 37%. Forced circulation boilers will cover 20 to 25% of the total output in 1965. With a rise of initial steam conditions, the power of feedwater pumps increases and at 300 atm it amounts to 4.5% of the power output of the

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installation. The power consumed by coal pulverising mills and boiler draught fans becomes substantial and much attention will be devoted to the efficiency of auxiliary plant. Drum-type ball mills of 50 t/h output will be made in large batches and so will centre mills of 30 t/h and shaft mills of 50 t/h. The output of powerful mills will amount to 43% of the total and that of the largest boiler fans to 25% of the total. The development of automation devices will follow the trend towards electronic, electronic-pneumatic and electronic-hydraulic systems for boiler-turbine block units. Television apparatus for boiler supervision and automatic boiler starting and stopping systems will be developed. Small power stations will be authorised only where the combined supply of power and heat cannot be economically provided by regional or industrial district heating power stations. Small power stations will be based on the supply of the turbine and boiler plants in the form of large portable block units. Particular attention will be paid to automatic operation and simplicity of servicing. Block units rated 1 500 kW and above-floor installation rated up to 6 000 kW will be produced. The total output of

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small power turbines will amount to about 10% of the overall production. The hydroelectric power resources of the USSR suitable for practical exploitation amount to 1 720 billion kWh/annum. The Krasnoyarsk hydro-electric power station of 4 000 MW to generate 19 billion kWh/annum has been started. A project exists for the Yeniseysk hydro-electric power station also on the Yenisey River. This will have a total, installed power of 6 000 MW and generate 35.5 billion kWh/annum and is destined to be the most economic of all existing power stations or those under construction. The Bratsk hydro-electric power station with an output of 3 600 MW to generate 21.6 billion kWh/annum is under construction. The Stalingrad and Saratov Stations on the Volga River, the Votkinsk and Nizhne-Kamskaya stations on the Kama River and others are being built. Projects exist for a number of stations on the Ob River. The possibility of the construction of open-air hydro-electric power stations is being considered. The total power of hydraulic turbines to be erected in 1959-1965 will amount to 20% of the total generating plant produced. The LMZ (Leningrad Metal Works) and the Khar'kovskiy turbinniy zavod (Kharkov

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Turbine Plant) are called upon to create a series of new hydraulic turbines, in particular, contra-rotating turbines for low (5-12 m) and high (60-80 m) heads, both with variable pitch blades, efficient radial-axial turbines for heads of 400-450 m, diagonal variable pitch turbines for 60-150 m heads, horizontal axial and semi-axial turbines for use with low and medium heads and special turbines for hydraulic pumping stations and tidal stations. Hydraulic turbine manufacturers will also produce designs of means against over-speeding (to replace the expensive rapid-acting screens) and will develop better wear-resisting and cavitation-resisting turbines. Welded, welded-cast and welded-forged designs will be developed. Regulating apparatus, particularly electro-hydraulic and remote-controlled will be developed. Apart from the special uses of gas turbines in connection with gas pipelines and blast furnaces, power-generating installations in regions adjoining gas and oil-producing districts are foreseen, rated 25-50 MW with turbine inlet temperatures of 700 - 800 °C. The comparison of the economics of gas turbine and steam turbine power stations carried out by the "Teploelektroproyekt" Institute

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shows that, when using solely natural gas and operating outside the grid system, a gas turbine plant of 25-50 MW output is economically justified. For larger power stations of 50-300 MW, working in large grids, the use of gas turbine units of 50 MW and over is promising. The main factor in raising the efficiency of gas turbine plants is the working temperature of the gas. New types of heat-resisting steels and effective cooling methods are needed. Research work in this direction is envisaged. The TsKTI (Central Boiler-turbine Institute) imeni I.I. Polzunov and the turbine constructors will carry out research to develop the most efficient flow elements and heat exchange equipment, as well as examine the strength of individual gas turbine components. The design of gas-turbine plants of up to 100-200 MW rating is envisaged on the closed-cycle principle. The construction of experimental steam-gas installations with high-pressure steam generators is foreseen. Such plants will become highly promising in connection

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with the change-over of a large number of regional power stations to the burning of natural gas. Heat economy of up to 15% is expected, together with a reduction of weight and size of the plant. Gas turbine plant of 25-50 MW together with steam turbine plants of 150-200 MW can be combined into large steam-gas installations.

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