1960 -

REEL

#23

ARTYM, A.D.

USSR/ Electronics - Modulators

Card 1/1 Pub. 133 - 5/19

Authors : Artym, A. D., Candidate of Engineering Sciences and Lecturer at the Kalinin Polytechnic Institute of Leningrad

Title : New method of suppressing dynatron-oscillations generated in powerful modulator-installations (in radio transmission)

Periodical : Vest. svyazi 1, 10 - 11, Jan 1955

Abstract : A new method of suppressing oscillations when instability develops in radio transmitters operating with powerful dynatron tubes, is described. The method consists in incorporating an anti-dynatron tube. Experiments were conducted to determine the stability of various modulation systems equipped with and without an anti-dynatron tube. Oscillograms show the advantages of the proposed method which also results in an increase in power economy and reduction in non-linear distortions in the grid circuit of the modulator tube. Circuit diagram; graphs.

Institution: .....

Submitted: .....

ARTIM, A. D.

"A New Method of Phase Modulation," Radio Tekh, No 1, p 53, 1955

ACC NR: AT7002610 SOURCE CODE: UR/0000/66/000/000/0033/0039

AUTHORS: Artykov, T. U.; Avazmukhamedova, K.

ORG: none

TITLE: On two methods for solving Helmholtz and Poisson equations

SOURCE: AN UzSSR. Institut matematiki. Resheniye uravneniy gidrotermodinamiki primenitel'no k zadacham meteorologii (Solution of equations in hydrothermodynamics applied to problems in meteorology) Tashkent, Izd-vo FAN UzSSR, 1966, 33-39

TOPIC TAGS: Poisson equation, weather forecasting, approximation, atmospheric geopotential, weather map, matrix element

ABSTRACT: An experimental study of numerical weather forecasting is made. The work was done to reduce the errors caused by insufficient description of physical processes by mathematical equations and by calculation errors. The method of planes is used. The matrix of the known right sides of the Helmholtz equation

$$\Delta \frac{\partial H}{\partial t} - k^2 \frac{\partial H}{\partial t} = -\frac{g}{l}(H, \Delta H) - \beta \frac{\partial H}{\partial x}.$$

is found. Its elements are

$$F_{ij} = \frac{g}{l}(H, \Delta H)_{ij} + \beta \left(\frac{\partial H}{\partial x}\right)_{ij}.$$

Then the method of straight lines with respect to the variable y is used. The

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obtained system of ordinary differential equations for x is put in canonical form

$$\frac{d^2\Phi}{dx^2} - \left(k^2 + \frac{2}{h^2}\right)\Phi + \frac{1}{h^2} L(A)\Phi = M.$$

The influence-function method is examined. A working formula for the Helmholtz and Poisson equations is found as

$$\frac{\partial H}{\partial t} = \sum_{i=1}^{n} b_i A_9,$$

where b_i are the weighting factors and n = 45 is the number of points within the selected domain. The Jacobians in this formula are determined. The results obtained show that the Helmholtz equation gives a better description of the prognostic fields. Orig. art. has: 7 formulas, 2 maps, and 2 tables.

SUB CODE: 12, 04/ SUBM DATE: 26May66/ ORIG REF: 005

ARTYM, A.D., kandidat tekhnicheskikh nauk.

Theory of grid limiters. Tekh.televid no.6:50-71 '55.

(MIRA 10:3)

(Electron tubes)

ARTYM, A. D.

USSR/Electronics - Transmitter modulation FD-2293

Card 1/1 Pub 90-6/12

Author : Artym, A. D., Active Member VNORiE

Title : New Method of Phase Modulation

Periodical : Radiotekhnika 10, 53-60, Jan 1955

Abstract : The article, which was delivered as a report in April 1954 at a VNORiE conference, examines a new method of phase modulation based on use of nonlinear amplitude modulation. The method makes it possible to obtain increased (in essence, non-limited) phase deviations. A mock-up exciter with FM, the schematic of whose phase modulator is reproduced in the text, was used for experimental checking and gave a phase deviation of ± 540°. Diagrams, graphs. 3 references, all USSR.

Institution: All-Union Scientific and Technical Society of Radio Engineering and Electric Communications imeni A. S. Popov (VNORiE)

Submitted : July 12, 1954

ARTYm, A.D

USSR/Electronics - Frequency Modulation FD-2500

Card 1/1 Pub. 90-8/9

Author : Artym, A. D., Active Member, VNORiE

Title : Increasing the effectiveness of reactance tubes

Periodical : Radiotekhnika, 10, 67-77, Jun 55

Abstract : A method of increasing the effectiveness of reactance tubes used in broadcasting frequency modulation is described. It is shown that increasing the effectiveness of a reactance tube also increases the stability of operation in the medium-frequency range. It is shown that the effectiveness of the reactance tube is proportional to its susceptance. Results are cited of experimental verification done with an FM exciter using a master oscillator built around 6Zh4 tubes and calculated for 5.4 Mc. Graphs. Four USSR references.

Institution : All-Union Scientific and Technical Society of Radio Engineering and Electric Communications imeni A. Popov (VNORiE)

Submitted : March 25, 1955

ARTYM, A.D.

Generating frequency modulated oscillations and transmitting them through linear networks. Trudy LPI no.181:111-123 '55.
(Radio frequency modulation) (MLRA 10:1)

ARTYM, A.D.; GAVRA, T.D.

[redacted]

New method of suppressing dynatron oscillations in powerful modulators. Trudy LPI no.181:124-130 '55. (MLRA 10:1)
(Radio frequency modulation)

Radiotekhnika, 5, 35-43, My 1956 AID P - 4561

Card 2/2 Pub. 90 - 4/8

references (1953).

Institution : None

Submitted : Jl 30, 1955

ARTYM, A.D., kandidat tekhnicheskikh nauk, dotsent.

Protection of plate circuits of powerful radio transmitters. Vest. sviazi 16 no.5:9-11 My '56. (MLRA 9:8)

1. Leningradskiy politekhnicheskiy institut imeni M.I. Kalinina.
(Radio--Transmitters and transmission) (Electron tubes)

ARTYM, A.D.

CIRCUITS

"Thyratron Circuit for Disconnecting High-Voltage DC Circuits," by A.D. Artym. Elektrosvyaz' No 7, July 1957, pp 34-41

Analysis of a thyratron circuit used to disconnect high voltage anode circuits of output tubes of high-power radio transmitters in the case of breakdown of one of these tubes. It is shown that the disconnect time can be quite short (usually fractions of a millisecond), and that the maximum current during the disconnecting process is insignificant (for example, 20-30% higher than the maximum permissible current under normal conditions). Using thyratrons designed for hundreds of amperes and for breakdown voltages of 15 kv, it is possible to disconnect the anode circuit of transmitter tubes with a rating on the order of 1 megawatt or more.

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84156

9,3270

S/112/59/000/013/055/067
A002/A001

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 13, p. 264, # 28077

AUTHOR: Artym, A.D.

[redacted]

TITLE: The Application of Frequency and Phase Modulation for Transmitting the Television Image Signal

PERIODICAL: Tekhn. televideniya. M-vo radiotekhn. prom-sti SSSR, 1957, No. 23, pp. 3-35

TEXT: Methods of obtaining frequency modulation developed for broadcasting are practically unsuitable for television, where frequency deviation and the range of modulated frequencies are considerably greater. The method based on the application of the phase modulation is an effective method of obtaining a frequency modulation in which the stability of the mean modulation frequency is ensured. As a rule, phase modulators make it possible to obtain a relatively small modulation index and for its increase, it is necessary to perform a frequency multiplication. The phase modulation index required to obtain a given frequency modulation is many times higher in television than in broadcasting.

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84156

S/112/59/000/013/055/067
A002/A001

The Application of Frequency and Phase Modulation for Transmitting the Television Image Signal

Owing to this fact, the conventional methods of raising the phase modulation index are unsuitable. The author describes an efficient method of frequency modulation of the quartz stabilized carrier frequency by a wideband television signal. The method is based on the division of the spectrum of modulated frequencies. The relatively low carrier frequency is phase-modulated by a television signal, whose spectrum is limited by the frequency F_1, which is lower than the carrier frequency F_0. After the multiplication of the frequency F_c by n times, it is additionally phase-modulated by a television signal, whose spectrum extends from F_1 to F_2. In this case, the signal F_2 is n times larger than the signal F_1. By a similar method, with an increase in the number of additional phase modulators, it is possible to obtain the required index of the frequency modulation with a relatively wide television signal spectrum. The author discusses conditions of matching several phase modulators used in the described method of obtaining frequency modulation, and ways of the practical realization of different variants of the aforementioned method. M.N.T.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

AUTHOR: Artym, A. D., Member of the Society SOV/108-13-8-6/12

TITLE: The Use of the Phase Auto-Trimming of Frequency (Primeneniya fazovoy avtopodstroyki chastoty)

PERIODICAL: Radiotekhnika, 1958, Vol. 13, Nr 8, pp. 37 - 46 (USSR)

ABSTRACT: The author investigates cases of the use of phase auto-trimming of frequency, as of a band of filter, of a frequency modulator and of a phase detector. The following is shown: 1) When the difference between the noise frequency and the tuning frequency of the generator to be stabilized is sufficiently great the PAT (phase-auto trimming) system leads to an increase of the signal-to-noise ratio which is proportional to the damping of the voltage level of the difference frequency in the filter as well as to the ratio between the double difference frequency to the half-width of the band of frequency synchronism $\Delta \omega_c$. 2) At the passage of the frequency-modulated oscillation through the PAT system distortions are formed. They are similar to those of the modulated low-frequency voltage in the equivalent scheme. 3) The PAT system can also be used as a phase modulator which

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The Use of the Phase Auto-Trimming of Frequency SOV/108-13-8-6/12

secures a modulation index within the borders of up to 90°. The non-linear distortions are practically completely determined by the characteristics of the phase detector. The frequency distortions of the modulating signal are characterized by the equivalent diagram in the modulation. 4) When using the PAT system as a frequency detector the non-linear distortions are determined by the modulation characteristics of the reactance tube. The important advantage of this frequency detector type is its simple control and tuning. There are 4 figures and 4 references, 1 of which is Soviet.

SUBMITTED: November 15, 1957

1. Frequency--Control 2. Phasemodulation--Equipment
3. Frequency analyzers--Equipment

Card 2/2

MODEL', Z.I.; ARTYM, A.D.

Using countercoupling for suppression of cross distortion in multichannel high-frequency amplifiers of single-band transmitters. Trudy LPI no.194:3-13 '58. (MIRA 11:11)

(Radio, Shortwave--Transmitters and transmission)

9(8) SOV/112-59-2-3781

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, Nr 2, p 223 (USSR)

AUTHOR: Artym, A. D,

TITLE: Equivalent Circuit of Auto-Anodic Modulation
(Ekvivalentnaya skhema avtoanodnoy modulyatsii)

PERIODICAL: Tr. Leningr. politekhn. in-ta, 1958, Nr 194, pp 26-35

ABSTRACT: It is pointed out that fundamental premises and the equivalent circuit of auto-anodic modulation, as set forth by Kruglov (Radiotekhnika, 1954, Nr 4), are not substantiated and that the results of solution of his differential equation are devoid of any practical value. The following are presented and explained: (1) an audio-frequency equivalent circuit and its parameters; (2) a complete equivalent circuit and its energy relations. It is shown that the auto-anodic modulation circuit can be replaced by its energywise equivalent, i.e., by a simple anodic modulation scheme whose modulator operates in class A. The advantages of the auto-anodic modulation circuit as compared to class-A

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SOV/112-59-2-3781

Equivalent Circuit of Auto-Anodic Modulation

parallel simple anodic modulation are: (1) automatically changing energy consumption that ensures the most economical operation, and (2) reduction of the number of tubes, thanks to the joint use of one tube as a modulator and as an oscillator. Class-B simple anodic modulation is more economical than auto-anodic modulation to that degree in which the class-B modulator is more economical than the class-A modulator; this advantage, however, is difficult to realize fully in practice. Bibliography: 2 items.

V.M.L.

Card 2/2

9(0)

SOV/112-59-5-9960

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 5, p 219 (USSR)

AUTHOR: Artym, A. D., and Tamm, D. L.

TITLE: Selecting the Transmitting System for Stereophonic Radio Broadcasting

PERIODICAL: Tr. Leningr. politekhn. in-ta, 1958, Nr 194, pp 44-53

ABSTRACT: From a consideration of the requirements of a stereophonic radio-transmission system, the following fundamental principles of the system have been drawn: (1) transmitting both stereo-sound channels can be realized by one radio transmitter having a subcarrier; (2) stereophonic program transmission can be realized by FM in the microwave band by using standard transmitters; (3) transmission-channel signals can be formed by the Crosby sum-difference method. The AM-subcarrier system has been selected for its simpler two-channel modulation and particularly for its simpler channel division in the receiver; with an FM system, a better (by 7 db) anti-noise feature could be obtained only by considerable complication of the receiver

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SOV/112-59-5-9960

Selecting the Transmitting System for Stereophonic Radio Broadcasting

circuit. Experimental testing of an AM master oscillator (a block scheme is presented) showed good quality in both channels with only 11 tubes and a simple alignment. The channel frequency characteristics show that the nonlinear distortion factor in any of the channels is not higher than 1.5% with m = 100%. The background-noise level lies lower by -65 db than the signal level at m = 100%. The experiments have proven that: (1) the above transmission-signal principle permits easy division of the two channels; (2) the master oscillator and the transmitter can secure a high quality of reproduction of the program. Bibliography: 5 items.

V.M.I

Card 2/2

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Translation from: Referativnyy zhurnal, Elektrotekhnika, 1960, No. 21, p. 41, # 6.17288

AUTHOR: Artym, A.D.

TITLE: A New Method for Generating Powerful Pulses

PERIODICAL: Nauchno-tekhn. inform. byul. Leningr. politekhn. in-t, 1959, No. 5, pp. 63-73

TEXT: The imperfections of the usual electron-tube modulators are considered which are used in radar stations: the low pulse intensity on account of which a pulse transformer is needed which raises the price and complicates the modulator; the infavorable conditions of de-ionization of the thyratron which limit the pulse recurrence frequency. A new method is proposed for generating powerful pulses (charging a capacitance and discharge through a thyratron and small inductance). The circuit diagram is presented and its operation is described; experimental results are considered which corroborate the possibility of generating pulses of prescribed duration T_p whereat the duration of the current pulse through the

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A005/A001

A New Method for Generating Powerful Pulses

thyratron is $\gg T_p$ and the pulse magnitude in a load minus the losses is equal to the break down voltage of the thyratron. The application of a charging choke and the selection of capacitances make it possible to reduce a few times the supply source voltage at the same pulse magnitude in the load.

V.I.Sh.

Translator's note: This is the full translation of the original Russian abstract.

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8(3) SOV/105-60-1-12/25

AUTHORS: Artym, A. D., Candidate of Technical Sciences,
Donskoy, A. V., Doctor of Technical Sciences

TITLE: Generating Damped High-frequency Oscillations by Means of Controlled Ionic Overvoltage Arresters

21

PERIODICAL: Elektrichestvo, 1960, Nr 1, pp 59-63 (USSR)

ABSTRACT: The principles for the generation of damped oscillations in circuits with controlled ionic overvoltage arresters, the deionization time of which is much longer than the period of the generated oscillations, are shown here. Circuits of generators and the optimum conditions of their parameters are investigated. The latter warrant the maximum output at a predetermined current impulse and the existing electric strength of the discharger. The positive properties of controlled ionic overvoltage arresters are: the ability of letting pass large impulse currents, the high electric strength and the negligible voltage drop at the electrodes during operation. This permits under otherwise equal conditions to commutate currents which are a multiple of those obtained in valve circuits. The ionic overvoltage arresters in particular can achieve a strong effect at an impulse excitation

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of the damped oscillations. The simplest wiring diagram of an impulse excitation is given in figure 1 and explained. The basic problem consists in creating conditions (independent of the frequency of the generated oscillations) at which the voltage at the discharger-anode remains negative sufficiently long, whilst the rate at which the positive voltage increases, remains sufficiently small. The simplest circuit scheme which warrants those conditions is shown in figure 3. The shortcomings of this circuit scheme are the necessity of selecting a much higher frequency of the discharger-circuit than that of the generated oscillations, as well as the necessity of maintaining the condition $C_2 \gg C_1$.- Based on the general investigation mentioned here it is shown that the shortcomings can be eliminated considerably. The circuit scheme shown in figure 5 is proposed as one of the possible circuit variants for it and explained. All basic theses of the paper under review were checked on the simulators of the induction heating installation in the research laboratories of the electrothermal plants of the Leningradskiy politekhnicheskiy institut im. Kalinina (Leningrad Polytechnic

Generating Damped High-frequency Oscillations by Means of Controlled Ionic Overvoltage Arresters

SOV/105-60-1-12/25

Institute imeni Kalinin) and the OKB elektrotermicheskogo oborudovaniya Lensovnarkhoza (Experimental Design Office for the Electrothermal Equipment of the Leningrad Sovnarkhoz). The results obtained thereby agree with the computed data. There are 8 figures and 4 Soviet references.

SUBMITTED: December 24, 1958

Card 3/3

30141
S/194/61/000/007/071/079
D201/D305

9,3280

AUTHORS: Artym, A.D., Gomoyunov, K.K. and Kozhevnikov, A.N.

TITLE: A shift-pulse reactance generator with a thyratron commutator

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 7, 1961, 33, abstract 7 K195 (Nauchno-tekhn. inform. byul. Leningr. politekhn. in-t, 1960, no. 3, 3-12)

TEXT: Theoretical and experimental analysis has been made of a circuit generating shift current pulses of magnetic elements. The circuit consists of a capacitor C charged through a diode and an inductance L_1 from a d.c. source, the resonant frequency of the circuit formed by L_1 and C being equal to the shift pulse repetition frequency. C discharges through an inductance L_2, connected in series with the discharge thyratron and the load, the resonant frequency of the L_2-C circuit being determined by the required duration of

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A shift-pulse reactance generator... D201/D305

the shift pulse. Special circuit is used for stabilizing the load current within very wide limits. The circuit shunts L_1 when C charges to a pre-determined value of voltage. The experiment has proved the correctness of basic assumptions obtained in the theoretical analysis of the circuit. 4 references. /Abstracter's note: Complete translation/

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24848 S/106/60/000/004/003/007
A055/A133

9,3274

AUTHOR: Artym, A. D.

TITLE: Use of nonminimum-phase circuits in some systems with phase conversions

PERIODICAL: Elektrosvyaz', no. 4, 1960, 14 - 20

TEXT: The author examines several practical nonminimum-phase circuits and, in particular, the circuits suitable for wideband phaseshifters and for phase control or phase modulation. A "classical" example of a nonminimum-phase four-pole section is given, where:

$$\sqrt{Z_x Z_y} = R \qquad (1)$$

R being the load resistance. The transmission coefficient of the circuit is:

$$K = \frac{1-\sqrt{\frac{Z_x}{Z_y}}}{1+\sqrt{\frac{Z_x}{Z_y}}} = \frac{1-\frac{Z_x}{R}}{1+\frac{Z_x}{R}} = \frac{1-\frac{R}{Z_y}}{1+\frac{R}{Z_y}} = -\frac{1-\frac{Z_y}{R}}{1+\frac{Z_y}{R}}. \qquad (2)$$

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A055/A133

Use of nonminimum-phase circuits in some...

If Z_x is iwL and Z_y is $\frac{1}{iwC}$, and if, according to (1), $\sqrt{\frac{L}{C}} = R$ we have:

$$K = \frac{1 - i\omega \frac{L}{R}}{1 + i\omega \frac{L}{R}} = \frac{1 - i\omega CR}{1 + i\omega CR} \qquad (3)$$

The modulus of K is equal to one for all frequencies, and the phase (varying from 0 to π) is determined by the relation:

$$\varphi = \arg K = 2 \text{ arc tg } \frac{wL}{R} = 2 \text{ arc tg } w\,CR. \qquad (4)$$

One of the practical defects of such a circuit is the presence of inductances. If Z_x and Z_y represent more complicated reactances satisfying condition (1), the amplitude characteristic will not change, but the phase variations will be equal to $n\pi$, where n is the number of zeros or poles in Z_x or Z_y. Thus if Z_x consists of parallel connected L and C (i.e. has zeros at frequencies 0 and ∞) and Z_y consists of series connected L and C (i.e. has poles at these frequencies), the condition (1) is satisfied if $\sqrt{\frac{L}{C}} = R$ and, according to (2):

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$$K = \frac{1 - \sqrt{\frac{Z_x}{Z_y}}}{1 + \sqrt{\frac{Z_x}{Z_y}}} = \frac{1 - i\frac{1}{\frac{\omega_0}{\omega} - \frac{\omega}{\omega_0}}}{1 + i\frac{1}{\frac{\omega_0}{\omega} - \frac{\omega}{\omega_0}}}, \qquad (6)$$

where

$$W_0 = \frac{1}{\sqrt{LC}} = \frac{1}{RC} = \frac{R}{L} \qquad (7)$$

whereas the phase is:

$$\varphi = 2 \text{ arc tg} \frac{1}{\frac{W_0}{W} - \frac{W}{W_0}} . \qquad (8)$$

With increasing frequency, the phase varies from 0 (for $w = 0$) to 2π (for $w = \infty$), its value being π for $w = w_0$. In the majority of practical cases, the input and output circuits must have a grounded point, owing to which a transformer must be added to such circuits. To avoid the use of transformers, it is expedient to

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choose circuits equivalent to crossed circuits. When the presence of a transformer is admissible, the circuit shown in Fig. 5 can, for instance, be used. Application to wide-band phase shifters. - The circuit of Fig. 5 can be used as the basic element of the wide-band phase shifter, i.e. as its section passing all frequencies. If capacitance C_{ac} is used as the reactance between grid and anode of the tube, the equivalent circuit will be that of Fig. 6. Comparing this circuit with that of Fig. 5, we find:

$$Z_1 = \frac{1}{iwC_{ac}},\ Z_3 = R_i,\ n = \mu.$$

$Z_2 = R_a$ is - according to (12) - equal to $R_a = \frac{R_i}{\mu-1} \approx \frac{1}{S}$, where S is the steepness of the tube. To reduce the circuit's sensitivity to variations of tube-parameters R_i and μ, it is expedient to provide negative current-feedback by inserting into the tube's cathode circuit a resistance not shunted by a capacitance. In this case, the equivalent internal resistance of the tube becomes $R_{ieq} = R_i(1+SR_k)$. Usually it is possible to choose R_k so that $SR_k \gg 1$. Then $R_{ieq} \approx R_iSR_k = \mu R_k$; $R_a = \frac{R_{ieq}}{\mu-1} \approx R_k$, and

$$K = \frac{1 - \frac{\mu}{1\omega C_{ac} R_{l_9}}}{1 + \frac{\mu}{1\omega C_{ac} R_{l_9}}} = \frac{1 - \frac{1}{1\omega C_{ac}\left(R_\kappa + \frac{1}{S}\right)}}{1 + \frac{1}{1\omega C_{ac}\left(R_\kappa + \frac{1}{S}\right)}} = -\frac{1 - 1\omega C_{ac}\left(R_\kappa + \frac{1}{S}\right)}{1 + 1\omega C_{ac}\left(R_\kappa + \frac{1}{S}\right)}. \quad (16)$$

If the capacitance of the output circuit is taken into account, the modulus of K becomes frequency-dependent. However, when the phase shifter is intended to operate in the af-range, the influence of C_2 can be neglected. The circuits of the examined type have a certain defect because of the inconstancy of the input impedance, which is very large at low frequencies and comparatively small at high frequencies, where it is nearing $1/2(R_k + 1/S)$. To remove this defect, it is appropriate to increase the input impedance of the circuit by increasing R_k, and to reduce the exciting circuit impedance by using cathode followers. Application to phase control circuits and to phase modulators. - In the circuits examined above, the phase varies with the parameter, but the modulus of the transmission coefficient remains constant. This property can obviously be made use of in phase control or in phase modulation of voltage at a given constant frequency. The

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A055/A133

Use of nonminimum-phase circuits in some...

easiest solution is to choose as variable parameter the variable resistance R (rather than L or C). This variable resistance can, for instance, be the output resistance of the grid modulated tube. In the case of Fig. 5, it is convenient that Z_2 and Z_3, should be capacitive, Then Z_1 must be a pure resistance (variable resistance. The input capacitance of the next stage can be used as C_2. For phase control or for phase modulation, it is convenient to choose the circuit shown in Fig. 11, where the variable resistance R_1 is the output resistance of the cathode follower, varying (depending on the cutoff grid-voltage) from about 1/S to about R_k (S being the steepness of the tube and R_k the cathode load; $R_k \gg 1/S$). Since, in this case, $Z_1 = R_1$, $Z_3 = \frac{1}{i\omega C_3}$, we obtain:

LX

$$\varphi = 2 \text{ arc tg}(nwC_3R_1), \qquad (19)$$

where n is the transformation ratio between halves of transformer secondary. In the ideal case, when the resistance varies from 0 to ∞, the phase varies from 0 to π. In other words, the maximum possible phase modulation is $\pm\pi/2$. There are 11 figures and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc. The references to English-language publications read as follows: Darlington. "Realization of a constant phase difference". BSTJ, v. 29, no. 1, 1954; Dome. "Wideband phase

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shift networks".' Electronics, Dec. 1946; Weaver, "Design of RC wideband 90-degree phase difference network". Proc. IRE, v. 42, no. 4, 1954. [Abstracter's note: Subscript "eq" (equivalent) is the translation of "э".]

SUBMITTED: January 6, 1960

Fig. 5.

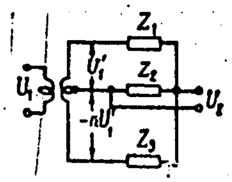


Fig. 6.

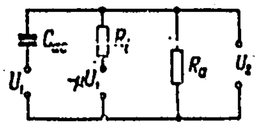


Fig. 10.

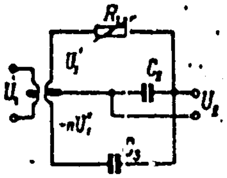
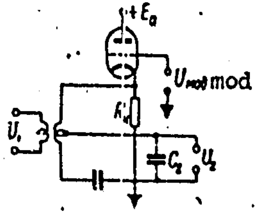


Fig. 11.



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ARTYM, Anatoliy Dmitriyevich; MODEL', A.Z., red.; SOBOLEVA, Ye.M., tekhn. red.

[Theory and methods of frequency modulation] Teoriia i metody chastotnoi moduliatsii. Moskva, Gos. energ. izd-vo, 1961. 242 p. (MIRA 14:9)

(Radio frequency modulation)

ARTYM, A.D.

Methods for carrying out linear frequency modulation of quartz oscillators. Elektrosviaz' 15 no.7:23-29 Jl '61. (MIRA 14:6)
(Oscillators, Crystal) (Modulation (Electronics))

33699
S/106/62/000/002/005/010
A055/A101

9,2583 (1040,1147,1159)

AUTHORS: Artym, A. D., Volodin, V. V.

TITLE: Frequency modulation of crystal oscillators

PERIODICAL: Elektrosvyaz', no. 2, 1962, 32 - 35

TEXT: This article concerns the methods of frequency modulation by means of direct action upon the frequency stabilizing element, i.e. the crystal. Only one of such methods is (according to the authors) used to-day for high-quality broadcasting. There are other methods which proved to be simpler and more efficient. One of such methods is described in the present article. Instead of the usual circuit (Fig. 1a), the authors use the equivalent circuit of Fig. 1b, which shows that the "superfluous" element in their problem is C_0'. The effect of C_0' can be compensated appreciably with the aid of L_0' (Fig. 2a), tuned with C_0' to the mean oscillating frequency ω_0. The capacitance C_{osc} of the tube part of the system, including the mean value of the controlled capacitance C_{contr}, is compensated by L_{osc}, i.e.:

$$\omega_0 = \frac{1}{\sqrt{L_0'C_0'}} = \frac{1}{\sqrt{L_{osc}C_{osc}}}. \quad (1)$$

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Frequency modulation of crystal oscillators

The nonlinear distortions, conditioned by the difference of the examined system (Fig. 2a) from the antiresonance circuit (Fig. 2b) are given by

$$K_f = \frac{(\Delta\omega_m)^2}{2\omega_2(\omega_2-\omega_1)} \qquad (2)$$

where $\Delta\omega_m$ is the frequency deviation amplitude, ω_2 and ω_1 are, respectively, the crystal antiresonance and resonance frequency. The authors reproduce the diagram of their modulated crystal oscillator (Fig. 3). The parameters of the chosen crystal are: C_0 = 17.5 pf, C_1 = 0.022 pf, L_1 = 0.091 h, R_1 = 12ohms, f_2 = 3.56 Mc/s. The nearest spurious resonant frequency of the crystal is removed by 36 kc/s from the fundamental one. Owing to the dependence of the voltage across the 4K-resistance upon the modulating voltage, the diodes are unblocked for a time equal to a more or less considerable fraction of the period of the h-f oscillations, which causes a corresponding variation in the reactive component of the conductance (300 pf-capacitance in the circuit of the diodes and of the crystal). The equivalent reactive component of the modulated capacitance remains practically unchanged at considerable variations of the diode parameters. The described reactive modulator is therefore highly stable. The inductance in the anode circuit

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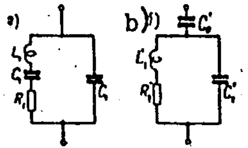
Frequency modulation of crystal oscillators

of the first tube plays the part of L_{osc} of Fig. 2a. With the aid of the parallel-connected variable capacitance, the system is tuned so that, at the medium value of the controlled reactance and the crystal being pulled out, the frequency of the oscillations is about equal to the carrier frequency. The inductance in the crystal circuit (L_0' in Fig. 2a) is tuned to resonance with the crystal capacitance (C_0') (with the aid of the series-connected variable capacitor). The second stage ensures the suppression of spurious frequencies. Some experimental results are added. There are 4 figures, and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: Mortley. FMQ. Wireless World, 1951, 57. Mortley. Frequency-modulated quartz oscillators for broadcasting equipment. Proc. IEE., 1957, v. 104, no. 15. The Soviet authors or scientists mentioned in the article are: M. G. Margolin, F. V. Kushnir and I. A. Shidlovskiy.

SUBMITTED: January 3, 1961

Figure 1.



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ARTYM, A.D.

Definition of an active electrical network. Radiotekhnika 20 no.7:76 Jl '65. (MIRA 18:8)

ACC NR: AM6010603 Monograph UR/

Artym, Anatoliy Dmitriyevich

Electric adjusting circuits and amplifiers; theory and design (Elektricheskiye korrektiruyushchiye tsepi i usiliteli; teoriya i proyektirovanye) Moscow, Izd-vo "Energiya", 1965. 418 p. illus., biblio. 9000 copies printed.

TOPIC TAGS: electronic amplifier, electronic circuit, radio communication system, radio engineering, negative feedback, frequency conversion

PURPOSE AND COVERAGE: This book is intended for scientific and technical personnel concerned with the planning and development of radio-communication systems and equipment, pulse technique, automatic control, etc.; it may also be used by aspirants and students in advanced courses at radio-engineering schools of higher education. The book discusses methods of analyzing and synthesizing stable linear electric circuits of the active and passive type, as well as the theorems pertaining to the link between the real and imaginary components of the circuit function. Examples are presented, and solutions are given for a series of practical problems connected with the planning of electrical systems possessing optimal characteristics. The general theory of multistage amplifiers with an absolutely stable

Card 1/6 UDC: 621.373.+621.375.132

ACC NR: AM6010603

negative feedback is presented.

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28222
S/194/61/000/005/063/078
D201/D303

9.3273 (also 2301, 3101)

AUTHOR: Artym. D.

TITLE: Increasing the precision of the equation of frequency modulated oscillations

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 5, 1961, 9, abstract 5 I67 (Nauchno tekhn. inform. byul. Leningr. politekhn. in-t, 1960, no. 3, 84-93)

TEXT: More precise solutions (P) are given for the equation of the FM oscillations. These solutions are required either when carrying out the exact analysis or when the ratio of change of frequency is so great that it becomes necessary to consider the process by which the frequency is being set up. The more precise solutions make it possible on the one hand to correct for the non-stationary operation and consequently to determine the criteria determining the limits of applicability of this operation. On the other hand,

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they permit the establishment of a stability criterium with the aim of avoiding the danger of inducing parametric oscillations. The solutions are found in the first, second, third and fourth approximations both for the particular case of a harmonic modulating signal and for the general case of a harmonic function which may be represented by the Fourier series. The first approximation of P of the FM equation is the quasi-stationary solution. From the second approximation the AM depth which is associated to FM is determined. The P in the third approximation permits evaluation of the amount of linear distortions in FM and the fourth - that of non-linear distortions. The more exact solution of the Mathieu equation makes it possible to analyze the problem of stability and to determine its corresponding criteria. 3 figures. 3 references. /̲ Abstracter's note: Complete translation_7

Card 2/2

MORYGANOV, P.V.; ARTYM, M.I.

Thermodynamic investigation of the cellulose fiber dyeing process using vat dyes. Izv.vys.ucheb.zav.; tekh.tekst.prom. no.2:125-133 '59. (MIRA 12:6)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Dyes and dyeing--Chemistry)

ARTYM, M.I.; MORYGANOV, P.V.

Kinetic investigation of dyeing cellulose fibers with vat dyes. Izv.vys.ucheb.zav.; tekh.tekst.prom. no.6:107-113 '59.
(MIRA 13:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Dyes and dyeing--Cellulose)

ARTYM, M.I.; MORYGANOV, P.V.

Relationship between the structure and affinity of vat dyes.
Izv.vys.ucheb.zav.; tekh.tekst.prom. no.3:110-116 '61.
(MIRA 14:7)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Dyes and dyeing--Textile fibers)

ARTYEM, M.I.; MORYGANOV, P.V.; KOROB[illegible]VA, A.N.

Investigating the migration of the leuco-compounds of vat dyes. Izv.vys.ucheb.zav.; tekh.tekst.prom. no.1:110-117 '63. (MIRA 16:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Dyes and dyeing—Textile fibers)

ARTYM, M.I.; MORYGANOV, P.V.

Relationship between the chromatographic constants of vat dyes and the magnitude of their affinity to cellulose fibers. Izv.vys. ucheb.zav.; tekh.tekst.prom. no.3:102-107 '65.

(MIRA 18:8)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.

ARTYM, R.I.

96-58-2-17/23

AUTHORS: Fastovskiy, V.G., Doctor of Technical Sciences, Artym, R.I., Engineer and Rovinskiy, A.Ye., Candidate of Technical Sciences

TITLE: The Boiling of Freon-11, Methylene Chloride and Benzene on a Horizontal Tube (Kipeniye freona-11, khloristogo metilena i benzola na gorizontal'noy trube)

PERIODICAL: Teploenergetika, 1958, No 2, pp. 77 - 80 (USSR)

ABSTRACT: The boiling equipment for these tests, which is illustrated in Fig.1, consisted of a steel tube 170 mm diameter and 280 mm long, closed at the ends and enclosing a thick-walled, German-silver tube 8 mm diameter and 200 mm long, heated by electric current. The evaporated vapour was condensed and returned to the main tube. The thermal loading of the heating surface was determined from the electrical power consumed; temperatures were measured by thermocouples at appropriate places. The substances tested were chemically pure methylene chloride and nominally pure Freon-11 and benzene. Measurements of the boiling points of these liquids at atmospheric pressure showed that the Freon-11 and benzene were also comparatively pure. At the start of tests, the liquid was boiled for some hours to remove gases from it and the equipment. The heating tube surface became contaminated and was cleaned from time to time.

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96-58-2-17/23

The Boiling of Freon-11, Methylene Chloride and Benzene on a Horizontal Tube

In the region of well-developed boiling, the experimental data are correctly represented by the equation:

$$\alpha = Aq^n$$

which is valid when q is greater than 6 000 kcal/m^2hour for CCl_3F and q is greater than 12 000 kcal/m^2hour for CH_2Cl_2 and C_6H_6. The values of the constants in this formula are tabulated. The experimental results are also plotted in Fig.2, which clearly indicates the commencement of bubble formation. The test results in terms of the criterial relationship of Kruzhilin are graphed in Fig.3. It is noticeable that although the physical properties of Freon-11 do not differ much from those of the other liquids used, yet its heat-transfer coefficients on boiling are much higher at the same thermal loads. The article then discusses bubble formation during different phases of boiling and relates the results to the work of other authors. There are 3 figures and 11 references, 4 of which are Russian, 4 English, 2 German and 1 Japanese.

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96-58-2-17/23

The Boiling of Freon-11, Methylene Chloride and Benzene on a Horizontal Tube

ASSCCIATION: All-Union Electrotechnical Institute (Vsesoyuznyy elektrotekhnicheskiy institut)

AVAILABLE: Library of Congress

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1. Methylene chloride-Boiling 2. Benzene-Boiling 3. Freon-Boiling 4. Heating elements-Applications

SOV/96-58-8-15/22

AUTHORS: Fastovskiy, V.G. (Doctor of Technical Science) and Artym, R.I. (Engineer)

TITLE: An experimental Investigation of the Critical Thermal Load during Boiling of Binary Mixtures (Eksperimental'noye issledovaniye kriticheskoy teplovoy nagruzki pri kipenii binarnykh smesey)

PERIODICAL: Teploenergetika, 1958, Nr 8, pp 74-78 (USSR)

ABSTRACT: This article reports an investigation of the critical thermal load at atmospheric pressure as a function of the composition for mixtures of methanol, propanol, iso-propanol, n-butanol, methylethylketone and iso-amyl alcohol in water. The experimental equipment is first described and the reasons why certain design features were chosen are explained: a schematic diagram appears in Fig 1. The tests were made on a horizontal nickel wire 0.4 mm diameter and 50 mm long. An editorial note states that because of the small size of the heating surface, the tests are not characteristic of industrial conditions. The chemicals used were chemically pure, except for the n-butanol which was of technical purity. The critical point was determined

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An Experimental Investigation of the Critical Thermal Load during Boiling of Binary Mixtures

visually and by instruments. In the majority of aqueous solutions with small amounts of organic components the wire usually burnt out when the critical condition was reached. The critical thermal load as a function of composition for the system methanol/water is plotted in Fig 2. The broken line corresponds to water alone. The maximum thermal load was obtained with a composition of 18% by weight methanol, and is double the load for water. Figs 3 and 4 display corresponding curves for iso-propanol/water and n-propanol/water. Again the results depend on the composition, and are typical for solutions of unlimited mutual solubility. Figs 5, 6 and 7 give corresponding graphs for the binary systems comprising methylethylketone/water, n-butanol/water and iso-amyl alcohol/water, which have limited mutual solubility. The limits within which single phase is not obtained are indicated in Figs 5 and 6 by vertical dotted lines. Thus in Fig 5 there are three parts of the curve; the first corresponds to a solution of methylethylketone in water, the third to a solution of

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water in methylethylketone, whereas the second is transitional. Similar results were obtained for the system isoamyl-alcohol/water (Fig 7). The curve in Fig 6 for the system n-butanol/water is continuous because the wire was always in a solution of water in n-butanol. For all three systems there is a clearly-expressed maximum at low concentrations of the organic component in water. As the solubility of the organic component becomes less, this maximum becomes higher and occurs at lower concentrations. Thus the critical thermal loading for the system isoamyl alcohol/water, at an alcohol concentration of C.5% weight, was three times that for water. These results are generally in line with other published work. The mechanism of the effect of small amounts of organic solvent on the critical thermal loading at which bubble boiling ceases is discussed. When the solution boils inside a nascent bubble it is mainly the low-boiling component that boils; the film of liquid enveloping the steam bubble is enriched with the high-boiling component and, therefore, boils at a higher

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An Experimental Investigation of the Critical Thermal Load during Boiling of Binary Mixtures

temperature than the initial composition. Curves of this temperature difference as functions of composition are given in Figs 2 - 7 inclusive. Of course, small amounts of organic liquids in water have a considerable effect on such other properties as the surface tension and the wetting angle.

There are 8 figures, 8 literature references (2 English, 3 German, 3 Soviet)

ASSOCIATION: Vsesoyuznyy elektrotekhnicheskiy institut (All-Union Electrotechnical Institute)

1. Cyclic compounds--Thermal effects 2. Cyclic compounds--Test methods 3. Cyclic compounds--Phase studies 4. Laboratory equipment--Applications

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05302
SOV/170-59-8-13/18

10(4); 28(5)

AUTHOR: Artym, R.I.

TITLE: Formation of Nuclei of a New Phase in Diluted Binary Solutions

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 8, pp 103 - 107 (USSR)

ABSTRACT: Some solutions, investigated in Reference 1, possess certain advantages in comparison with pure water, in particular in cooling nuclear reactors of the boiling type. In view of insignificant concentration of a second component in water, it is admissible to consider these systems as diluted binary solutions. It is known that heat exchange during boiling is determined by two individual processes: formation of nuclei of a new phase and their subsequent growth. This paper considers the process of formation of nuclei by calculating the probability of their origination from the viewpoint of the basic tenets of statistical physics. The principal condition for the formation of nuclei is formulated as follows: this process will occur when the gaseous phase is more stable and liquid phase is in a thermodynamical metastable equilibrium. The author derives equations for the radius of a nucleus, Formulae 10 and 12, and for the probability of their formation, Formula 11, and applies them to several particular cases. Their

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24.5300 (also 1498)

AUTHOR: Artym, R. I.

TITLE: Calculation of thermodynamic functions of ideal gases from spectroscopic data

PERIODICAL: Zhurnal fizicheskoy khimii, v. 34, no. 8, 1960, 1816-1825

TEXT: Aim of the present study is the calculation of the statistical sum O_{vj} of vibrational and rotational states, considering the interaction between rotation and vibrations, and, assuming that the quantum numbers be limited. I) To calculate the sum of the vibrational states of a multiatomic molecule the following is written down: $Q(v_1, v_2, \ldots, v_k) = \sum_{v_1, \ldots, v_k} \exp(-hc\omega_{ok} v_k/kT)(P + \sum P_i v_i + \sum P_{ii} v_i^2 + \sum P_{ij} v_i v_j + \sum P_{iii} v_i^3 + \sum P_{iij} v_i^2 v_j + \sum P_{ijk} v_i v_j v_k + \ldots)$. The calculation of Q_v is reduced to the calculation of sums of the form: $\sum_v \exp(-hc\omega_o v/kT)$; $\sum_v v \exp(-hc\omega_o v/kT)$;

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$\sum_v v^2 \exp(-hc\omega_0 v/kT)$; .... $\sum_v v^n \exp(-hc\omega_0 v/kT)$ (2). The denotations are substituted as follows: $hc\omega_0/kT = u$; $r = \exp(-u)$; $s = 1/1 - r)$ (3), giving $\sum_{v=0}^{\infty} \exp(-uv) = s$ (4). Consecutive differentiation of the series Eq. (4) and changing of the sign gives the summation equations: $\sum_{v=0}^{\infty} v \exp(-uv) = sf$; $\sum_{v=0}^{\infty} v^2 \exp(-uv) = sf^2$; $\sum_{v=0}^{\infty} v^3 \exp(-uv) = sf^3$;...... $\sum_{v=0}^{\infty} v^n \exp(-uv) = sf^n$, where the functions f^i are defined as: $f = 1.1!rs$; $f^2 = 1.1!rs+1.2!r^2s^2$; $f^3 = 1.1!rs+3.2!r^2s^2+1.3!r^3s^3$; $f^n = a_{1n}.1!rs + \sum_{k=2}^{k=n-1} a_{kn}k!r^ks^k+a_{nn}n!r^ns^n$ (5); where $a_{1n}=a_{nn}=1$ holds (6). All other coefficients are interrelated by the equations: $a_{kn} = ka_{k(n-1)}+a_{(k-1)(n-1)}$ (7). As the vibrational quantum number cannot adopt infinitely high values, it holds: $\sum_{v=0}^{v_m} \exp(-uv) = s(1 - r^{v_m+1})$, and, as $v_m \gg 1$, as approximation: $\sum_{v=0}^{v_m} \exp(-uv) = s(1 - r^{v_m})$ (9). The following summation equations are obtained by consecutive differentiation

$$\sum_{v=0}^{v_m} ve^{-uv} = sf - sr^{v_m}(v_m + f), \quad \sum_{v=0}^{v_m} v^2e^{-uv} = sf^2 - sr^{v_m}(v_m + f)^2 =$$

$$= sf^2 - sr^{v_m}(v_m^2 + 2v_m f + f^2), \quad \sum_{v=0}^{v_m} v^3e^{-uv} = sf^3 - sr^{v_m}(v_m + f)^3 =$$

$$= sf^3 - sr^{v_m}(v_m^3 + 3v_m^2 f + 3v_m f^2 + f^3), \quad \sum_{v=0}^{v_m} v^4e^{-uv} =$$

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$$= sf^4 - sr^{v_m}(v_m + f)^4 = sf^4 - sr^{v_m}(v_m^4 + 4v_m^3 f + 6v_m^2 f^2 + 4v_m f^3 + f^4), \ldots$$

$$\ldots, \sum_{v=0}^{v_m} v^n e^{-uv} = sf^n - sr^{v_m}(v_m + f)^n = sf^n - sr^{v_m}\Big(v_m^n + nv_m^{n-1}f +$$

$$+ \frac{n(n-1)}{2!} v_m^{n-2} f^2 + \ldots + \frac{n(n-1)\ldots(n-m+1)}{m!} v_m^{n-m} f^m + \ldots + f^n\Big), (10)$$

where $f, f^2, \ldots, f^n$ are calculated from Eqs. (5). II) This method is applied to calculate Q_v in diatomic molecules. It is assumed that: $Q_v = \sum_{v=0}^{v_m} \exp\left[-(hc/kT)(\omega_o v - \omega_o x_o v^2 + \omega_o y_o v^3 - \omega_o z_o v^4 \ldots)\right]$ (13). By substituting the denotations from Eqs. (3), and expansion in a Maclaurin's series the following is obtained: $Q_v = \sum_{v=0}^{m} \exp(-uv) \left[1 + ux_o v^2 + (1/2!)u^2 x_o^2 v^4\right.$

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$+\dots+(1/2n!)u^{2n}x_0^{2n}v^{4n}\Big] \times \Big[1 - uy_0v^3+(1/2!)u^2y^2v^6 - \dots + (1/2m!)u^{2m}y_0^{2m}v^{6m} \times \Big[1+uz_0v^4+(1/2!)u^2z_0^2v^8+\dots+(1/2l!)u^{2l}z_0^{2l}v^{8l}\Big]$ (14). This equation is calculated by Eqs. (10) and gives:

$$\begin{aligned} Q_v = s\Big\{&(1 - r^{v_m}) + ux_0\,[f^2 - r^{v_m}(v_m^2 + 2v_mf + f^2)] - \\ &- uy_0\,[f^3 - r^{v_m}(v_m^3 + 3v_m^2f + 3v_mf^2 + f^3)] + \\ &+ \left(\frac{1}{2}u^2x_0^2 + uz_0\right)[f^4 - r^{v_m}(v_m^4 + 4v_m^3f + 6v_m^2f^2 + 4v_mf^3 + f^4)] - \\ &- ux_0y_0\,[f^5 - r^{v_m}(v_m^5 + 5v_m^4f + 10v_m^3f^2 + 10v_m^2f^3 + 5v_mf^4 + f^5)] + \dots \\ &\dots + \frac{1}{2n!\,2m!\,2l!}u^{2(n+m+l)}x_0^{2n}y_0^{2m}z_0^{2l}\,[f^{2(2n+3m+4l)} - r^{v_m}(v_m + f)^{2(2n+3m+4l)}]\Big\}. \end{aligned} \quad (15)$$

(15)

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After rearrangement, it results therefrom:

$$\times\left(1-uy_0v_m^3+\ldots+\frac{(-1)^{2m-1}}{(2m-1)!}u^{2m-1}y_0^{2m-1}v_m^{6m-3}\right)\times$$

$$\times\left(1+uz_0v_m^4+\ldots+\frac{1}{2l!}u^{2l}z_0^{2l}v_m^{8l}\right)+uz_0f^4\left(1+ux_0v_m^2+\ldots+\frac{1}{2n!}u^{2n}x_0^{2n}v_m^{4n}\right)\times$$

$$\times\left(1-uy_0v_m^3+\ldots+\frac{1}{2m!}u^{2m}y_0^{2m}v_m^{6m}\right)\times$$

$$\times\left(1+uz_0v_m^4+\ldots+\frac{1}{(2l-1)!}u^{2l-1}z_0^{2l-1}v_m^{8l-4}\right)+\ldots$$

$$\ldots+\frac{(-1)^m}{n!\,m!\,l!}u^{n+m+l}x_0^ny_0^mz_0^l\cdot f^{2n+3m+4l}\times\left(1+ux_0v_m^2+\ldots+\frac{1}{n!}u^nx_0^nv_m^{2n}\right)\times$$

$$\times\left(1-uy_0v_m^3+\ldots+\frac{(-1)^m}{m!}u^my_0^mv_m^{3m}\right)\times$$

$$\times\left(1+uz_0v_m^4+\ldots+\frac{1}{l!}u^lz_0^lv_m^{4l}\right)\Big]\Big\}-\Delta Q(v_m). \qquad (16) \qquad (16)$$

(ангар = anharmonic); The following holds for it:

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$$Q^{\infty}_{\text{aurap}} = 1 + ux_0f^2 - uy_0f^3 + \left(\frac{1}{2}u^2x_0^2 + uz_0\right)f^4 - ux_0y_0f^5 + \dots + \dots \frac{(-1)^m}{n!\,m!\,l!}u^{n+m+l}x_0^ny_0^mz_0^l\cdot f^{2n+3m+4l} \qquad (17)$$

(17)

$$\Delta Q\,(v_m) = sr^{\varepsilon m}\Big\{2ux_0f - 3uy_0\,(v_m^2f + v_mf^2) + 2u^2x_0^2\,(v_m^3f + v_m^2f^2 + v_mf^3) + 2uz_0\,(2v_m^3f + 3v_m^2f^2 + 2v_mf^3) - ux_0y_0\,(5v_m^4f + 9v_m^3f^2 + 9v_m^2f^3 + 5v_mf_4) + \dots + \frac{1}{2n!\,2m!\,2l!}u^{2(n+m+l)}x_0^{2n}y_0^{2m}z^{2l}\times \left[\sum_{\substack{i=1\\ k=2(2n+3m+4l)}}^{k-1}\frac{k\,(k-1)\dots(k-i\div 1)}{i!}v_m^{k-i}\cdot f^i - \sum_{\substack{i=2\\ k=2n+3m+4l}}^{k-2}v_m^{k-i}\cdot f^i\sum_i\frac{n!}{n_1!\,n_2!}\,\frac{m!}{m_1!\,m_2!}\,\frac{l!}{l_1!\,l_2!}\right]\Big\}. \qquad (18)$$

(18)

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The values for n, m, l are chosen in such a way that the equation is fulfilled with any a priori accuracy:

$$\mathrm{exp}^{-hcG_0(v_m)/kT} = r^{v_m}\left(1 + ux_0v_m^2 + \ldots + \frac{1}{2n!}u^{2n}x_0^{2n}v_m^{4n}\right) \times$$

$$\times\left(1 - uy_0v_m^3 + \ldots + \frac{1}{2m!}u^{2m}y_0^{2m}v_m^{6m}\right)\left(1 + uz_0v_m^4 + \ldots + \frac{1}{2l!}u^{2l}z_0^{2l}v_m^{8l}\right) =$$

$$= r^{v_m}\left(1 + ux_0v_m^2 + \ldots + \frac{1}{(2n-1)!}u^{2n-1}x_0^{2n-1}v_m^{4n-2}\right) \times$$

$$\times\left(1 - uy_0v_m^3 + \ldots + \frac{1}{2m!}u^{2m}y_0^{2m}v_m^{6m}\right)\left(1 + uz_0v_m^4 + \ldots + \frac{1}{2l!}u^{2l}z_0^{2l}v_m^{8l}\right) \approx \ldots$$

$$\ldots \approx r^{v_m}\left(1 + ux_0v_m^2 + \ldots + \frac{1}{n!}u^nx_0^nv_m^{2n}\right) \times$$

$$\times\left(1 - uy_0v_m^3 + \ldots + \frac{(-1)^m}{m!}u^my_0^mv_m^{3m}\right)\left(1 + uz_0v_m^4 + \ldots + \frac{1}{l!}u^lz_0^lv_m^l\right). \quad (19)$$

(19)

Then Eq. (16) may be represented as follows: $Q_v = Q_v^{\infty} - Q_v^{\infty}\exp[-hcG_0(v_m)/kT] - \Delta Q(v_m)$ (20), where $Q_v^{\infty} = sQ^{\infty}_{anharm}$ (21). If the term $\Delta Q(v_m)$ is neglected in Eq. (20), the following is obtained: $Q_v = Q_v^{\infty}\{1 - \exp[-hcG_0(v_m)/kT$ (22),

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where v_m results from the condition $G(v_m) = D_o$, D_o being the dissociation energy of the molecule. III) To calculate the statistical sum Q_j of the rotational energy of a 2-atomic molecule in the ${}^1\Sigma$ electron state the following is written down: $Q_j = \sum_{j=0}^{j_m} (2j+1)\exp\left[-(hc/kT)\,B_v j(j+1) - D_v j^2(j+1)^2 + F_v j^3(j+1)^3 - \ldots\ldots\right]$ (25). In a similar way as for Q_v it is obtained:

$$Q_j = Q_j^{\infty} - Q_j^{\infty} e^{-hcF_v(y_m)/kT} - \Delta I_v(y_m) - \delta(y_m), \qquad (36)$$

where

$$\Delta I_v(y_m) = q_v \cdot e^{-y_m}\Big[2\delta_v q_v^3 y_m - 3\varphi_v q_v^3 (y_m^2 + 2y_m) + 2\delta_v^2 q_v^4 (y_m^3 + 2y_m^2 + 12y_m) - \delta_v \varphi_v q_v^5 (5y_m^4 + 18y_m^3 + 54y_m^2 + 120y_m) + \ldots + \frac{1}{2n!3m!}\delta_v^{2n}\varphi_v^{3m} q_v^{4n+6m} \times \left(\sum_{\substack{i=1\\k=4n+6m}}^{k-1} \frac{k!}{(k-i)!} y_m^{k-i} - \sum_{\substack{i=2\\k=2n+3m}}^{k-2} i! y_m^{k-i} \sum_i \frac{n!}{n_1!n_2!}\frac{m!}{m_1!m_2!}\right)\Big], \qquad (33)$$

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Calculation of thermodynamic...

$$Q_j^{\infty} = q_v\left(1 + \frac{1}{3q_v} + \frac{1}{15q_v^2} + d_v + 3d_v^2 - f_v - 10d_vf_v + \dots\right.$$

$$\left.\dots + (-1)^m \frac{(2n+3m)!}{2^n 6^m n! m!} d_v^n f_v^m\right). \qquad (37)$$

holds.

In (37), the relations $d_v = 2\delta_v q_v^2$, $f_v = 6\varphi_v q_v^3$ hold. $\Delta I_v(y_m)$ and $\delta(y_n)$ are neglected and it is finally obtained: $Q_j = Q_j^{\infty}\left\{1 - \exp\left[-hcF_v(j_m)/kT\right]\right\}$ (38).

IV) The following is written down for Q_{vj}:

$Q_{vj} = \sum_{v=0}^{v_m} \exp\left[-hcG_o(v)/kT\right] \sum_{j=0}^{j_m} (2j+1) \exp\left[-hcF_v(j)/kT\right]$ (42). Assuming that $q_v a_v = q_o a_o(1 + \sum_{k=1}^{n} \beta_k v^k)$ (43), $Q_{vj} = Q_v^{\infty} \cdot Q_{rot}^{\infty} \cdot Q_{int}^{\infty}\left[1 - \exp(-hcD_o/kT)\right]$

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Calculation of thermodynamic...

$- Q^{\infty}_{rot} \sum_{v=0}^{v_m} (1+\sum_{k=1}^{n} \beta_k v^k) \times \exp(-hcD_o/kT)$ (44) is obtained by the same method. Q^{∞}_{v} is calculated from Eq. (21). $Q^{\infty}_{rot} = q_o a_o$ (45) and is calculated from Eq. (37), where $q_v = q_o$, $a_v = a_o \cdot Q^{\infty}_{int}$, with Q_{int} being equal to $(1+\sum_{k=1}^{n} \beta_k f^k)$ (46). The following equations are written down for the free energy, enthalpy, entropy, and specific heat of diatomic ideal gases:

$$\frac{F-E_0}{RT} = -\ln Q^{\infty}_{vj} - \ln a; \qquad (47)$$

$$\frac{H-E_0}{RT} = \frac{H^{\infty}}{RT} - \frac{1}{a}\left[(1+b)\left(\frac{hcD_0}{kT}\right) - \frac{(H^{\infty}-H^{\infty}_{np})}{RT} b\right] e^{-hcD_0/kT}; \qquad (48)$$

$$\frac{S}{R} = \frac{S^{\infty}}{R} - \frac{1}{a}\left[(1+b)\left(\frac{hcD_0}{kT}\right) - \frac{(H^{\infty}-H^{\infty}_{np})}{RT} b\right] e^{-hcD_0/kT} + \ln a; \qquad (49)$$

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Calculation of thermodynamic...

$$\frac{v}{R}=\frac{C_v^{\infty}}{R}-\frac{1}{a}\left\{(1+b)\left(\frac{hcD_0}{kT}\right)^2-\frac{(C_v^{\infty}-C_{\text{вр}}^{\infty})}{R}b-\right.$$

$$\left.-\frac{(H^{\infty}-H_{\text{вр}}^{\infty})}{RT}\left[2\left(\frac{hcD_0}{kT}\right)-\frac{(H^{\infty}-H_{\text{вр}}^{\infty})}{RT}b\right]\right\}e^{-hcD_0/kT}-$$

$$-\frac{1}{a^2}\left[(1+b)\left(\frac{hcD_0}{kT}\right)-\frac{(H^{\infty}-H_{\text{вр}}^{\infty})}{RT}b\right]e^{-2hcD_0/kT}, \qquad (50)$$

where the following holds:

$$Q_{vj}^{\infty}=Q_v^{\infty}Q_{\text{вр}}^{\infty}Q_{\text{вз}}^{\infty},$$

$$a=1-(1+b)e^{-hcD_0/kT}, \qquad b=\frac{Q_{\text{вр}}^{\infty}\sum\limits_{v=0}^{v_m}\left(1+\sum\limits_{k=1}^{n}\beta_k v^k\right)}{Q_{rj}^{\infty}}. \qquad (51)$$

(Index вр, denotes rotation, index вз, interaction). B. I. Brounshteyn is mentioned. There are 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc. The three references to English-language publications read as

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Calculation of thermodynamic...

follows: L. S. Kassel, J. Chem. Phys. 1, 576, 1933; L. S. Kassel, Chem. Rev., 18, 277, 1936; A. R. Gordon, C. Barnes, J. Chem. Phys. 1, 297, 1933.

ASSOCIATION: Vsesoyuznyy elektrotekhnicheskiy institut, Moskva (All-Union Electroengineering Institute, Moscow)

SUBMITTED: November 26, 1958

Card 13/13

VUKALOVICH, M.P., doktor tekhn.nauk, prof.; ARTYM, R.I., inzh.

Calculation of thermodynamic function of polyatomic molecules in an ideal gaseous state. Teploenergetika 10 no.4:75-78 Ap '63. (MIRA 16:3)

1. Moskovskiy energeticheskiy institut.
(Steam—Thermal properties)

ACCESSION NR: AP4042461 S/0294/64/002/003/0359/0366

AUTHORS: Arty*m, R. I.; Spiridonov, G. A.

TITLE: Derivation of equation of state for binary particle mixture by the method of correlation functions

SOURCE: Teplofizika vy*sokikh temperatur, v. 2, no. 3, 1964, 359-366

TOPIC TAGS: equation of state, binary gas mixture, interaction potential, canonical distribution, correlation distribution function, integro-differential equation, short-range interaction, series expansion, classical equation, virial coefficient

ABSTRACT: Bogoliubov's method was used to determine the equation of state of a binary gas mixture N_1 and N_2 under the potential energy

$$U_N = \sum_{r=1}^{2} \sum_{1<i<j<N_r} \Phi_{rr}(|q_{ri} - q_{rj}|) + \sum_{i=1}^{N_1} \sum_{j=1}^{N_2} \Phi_{12}(|q_{1i} - q_{2j}|),$$

where Φ_{rs} is the two-particle interaction potential. The canonical distribution of Gibbs is adapted to the binary mixture case, and equations are obtained

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ACCESSION NR: AP4042461

which reveal asymmetric correlation distribution functions of second order. For a binary correlation function, an integro-differential equation is obtained which is then solved for short-range interactions, using a series expansion in powers of the density. Solutions are obtained up to second order in density, and a classical equation of state is derived for the mixture having the form

$$\frac{pV}{NkT} = 1 + \frac{B}{V} + \frac{C}{V^2} + \ldots,$$

where B and C are the second and third virial coefficients. B and C are obtained in generalized integral forms which are then reduced to simple summations

$$B = \sum_{i=1}^{2}\sum_{j=1}^{2} x_i x_j B_{ij}, \quad C = \sum_{i=1}^{2}\sum_{j=1}^{2}\sum_{k=1}^{2} x_i x_j x_k C_{ijk}$$

, using an appropriate coordinate transformation-integration. The extension to a multicomponent system or to a nonuniform interaction potential is shown to be immediately apparent. Orig. art. has: 31 formulas.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Institute of Heat Power)

SUBMITTED: 19Feb64

ENCL: 00

SUB CODE: ME,GP

NO REF SOV: 002

OTHER: 003

Card 2/2

ARTYM, R. I.

Calculation of the thermodynamic functions of polyatomic molecules. Zhur. fiz. khim. 36 no.6:1129-1135 Je '62. (MIRA 15:7)

ARTYM, R.I.; SPIRIDONOV, G.A.

Derivation of the equation of state for a binary mixture of particles by the method of correlation functions. Teplofiz. vys. temp. 2 no.3: 359-366 My-Je '64. (MIRA 17:8)

1. Moskovskiy energeticheskiy institut.

ARTYM, R.I. (Moscow)

Calculation of the statistical sums of diatomic molecules taking the highly excited electronic states into account. Zhur. fiz. khim. 38 no.6:1464-1473 Je '64.

(MIRA 18:3)

ARTYM, R.I.

Calculation of the statistical sums of diatomic molecules taking into account the highly excited electronic states. Part 2. Zhur. fiz. khim. 38 no.7:1734-1742 Jl '64.

(MIRA 18:3)

1. Energeticheskiy institut, Moskva.

ARTYMOWICZ, E.

Advanced methods of work in the Nitrate Works in Tarnow. p. 145.
Vol. 8, no. 5, May 1955. CHEMIK. Katowice, Poland.

So: Eastern European Accession. Vol 5, no. 4, April 1956

ARTYMOWICZ, E.

Schools of leadership at work in the Nitrogen Works in Tarnow. p. 114.
ACTA PHYSICA POLONCIA Warszawa Vol. 9. No. 4. Apr. 1956

SOURCE: EEAL LC Vol. 5. No. 11. Aug. 1956

ARTYMOWICZ, Krystyna

Association of Engineers and Technicians of the Metallurgic Industry as inspiring factor in developing modern techniques in Polish metallurgy. Przegl techn 84 no.28:10 14 Jl '63.

ARTYMOWICZ, M., inz.; DANIKIEWICZ, E., inz.

An extraordinary laser. Horyzonty techniki 15 no.4:16-19 '62.

S/636/61/000/000/010/013
D298/D303

AUTHOR: Artynkhina, N.I.

TITLE: Characteristic features of the structural changes in the central nervous system of rats, irradiated with X-rays during embryogenesis

SOURCE: Piontkovskiy, I.A. Vliyaniye ioniziruyushchego izlucheniya na funktsiyu vysshikh otdelov tsentral'noy nervnoy sistemy potomstva. Moscow, Medgiz, 1961, 156-172

TEXT: A study was conducted (1960) on the effects of ionizing radiation on the brain of rats irradiated on the 12th day of antenatal development, with a 200 r dose of radioactive cobalt (Co^{60}). Destruction of the embryo-genesis and the postnatal brain development was revealed. A study of the dynamics of postnatal brain development in animals irradiated on the 12th day of antenatal development showed a slowing down of the maturing of the cortex neurons in the cerebral hemispheres. The morphology tests showed a defect in the development of the optic foramen and subcortex centers

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and a deceleration of the postnatal differentiation process of the cortex neurons. The latter brings on dystrophy in the later stages of life and subsequent atrophy of the cortex. The author investigated the occurrence and development of structural impairments in the brains of rats during the antenatal and postnatal periods of development, irradiated during the fertile period on the 18th day of antenatal development. 125 rats, 70 experimental and 55 control, were used. The following conclusions could be made: 1) Irradiation of rats on the 18th day of pregnancy with a 200 r X-ray dose causes death of the fetal epithelium and neuroblasts surrounding it, clearly evident 6 hours after irradiation. 2) The death of the fetal epithelium during the formation period of the deep portions of the cortex girth causes underdevelopment in the surface layers of the cerebral hemosphere cortex of the fetus, especially in the dorso-medial portions of the cortex due to necrosis of the hemispheres in these portions causes, in turn, underdevelopment of the crust, regarded as a secondary body. 4) During the early period of postnatal life (1 - 21 days), coarse pathological changes of the nerve cells are absent in the animal's brain. The former appear after 45

Characteristic features of the ... S/636/61/000/000/010/013
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and 90 days more frequently in the cortex of the cerebral hemispheres. Cytolysis and wrinkling are the most frequent forms of nerve cell changes in the cortex, and vacuolization of the nerve cells in the sub-cortex formations. 5) All the irradiated animals showed an underdevelopment and atrophy of the synoptic ends on the appendices, and intensity drop of the RNA reaction as compared to the normal productive dystrophy changes of the microgly and vascular changes. 6) Irradiation of rats on the 18th day of antenatal development produces a significant weight lag of the brain and high fluctuations of the latter in animals of the same litter and age, as compared to the normals. The brain weight lag is mostly due to the underdevelopment of the cerebral hemispheres, primarily in the cortex. There are 16 figures and 1 table.

Card 3/3

ARTYNOV, A.P., aspirant

Zonal nonparallel train sheets. Vest. TSNII MPS 24 no.1:53-55 '65. (MIRA 18:6)

ARTYNOV, G.P.

[redacted]

Oxygen therapy and its methods. Sovet.med. No.3:27-31 Mar 51.
(CLML 20:6)

1. Candidate Medical Sciences. 2. Of the Hospital Therapeutic Clinic, Moscow Medical Institute of the Ministry of Public Health RSFSR (Head of Clinic -- Honored Worker in Science Prof. N.A.Kurshakov).

ARTYNOV, G.P.

Determination of gas metabolism with an open and closed type of apparatus. Ter. arkh. 23 no.1:38-44 Jan-Feb 51. (CLML 20:8)

1. Candidate Medical Sciences. 2. Of the Hospital Therapeutic Clinic (Director--Honored Worker in Science Prof. N.A. Kurshakov), Moscow Medical Institute of the Ministry of Public Health RSFSR.

ARTYNOV, M.; KAZNEVSKIY, M. [Kaznevs'kyi, M.]; PIL'CHEVSKAYA, S.M.
[Pil'chevs'ka, S.M.], red.; SEMENYUK, I.A., tekhn. red.

[Television]Telebachennia. Kyiv, Derzh.vyd-vo obrazotvorchoho
mystetstva i muzychnoi lit-ry URSR, 1962. 35 p. (MIRA 16:2)
(Ukraine--Television broadcasting)

ARTYNOV, V.V.

Speed of the movement of a cutter in clay muds. Trudy VNIIBT no.14:
125-129 '65. (MIRA 18:5)

ARTYNOVA, Ye.G.

Some methods of controlling corrosion in hot water supply systems.
Vod.i san.tekh. no.6:20-24 S'55. (MLRA 9:1)
(Hot-water supply) (Corrosion and anticorrosives)

ARTYNOVA, Ye.G., kand. tekhn. nauk; GOLUBNICHIY, L.P., kand. tekhn. nauk

Thermal regime of gutter spout funnels. Vod. i san. tekh. no.3: 12-14 '64 (MIRA 18:2)

ARTYNSKIY, V.M.

PHASE I BOOK EXPLOITATION SOV/3778

Ukrainian SSR. Gosudarstvennaya planovaya komissiya

Avtomatizatsiya i priborostroyeniye; sbornik nauchnykh trudov, vyp. 1. (Automation and Instrument Making; Collected Scientific Works, No. 1) Kiyev, Gostekhizdat UkrSSR, 1959. 107 p. 3,000 copies printed.

Ed.: V. Demskiy; Tech. Ed.: K. Gusarov; Editorial Board: P.M. Mel'nik (Chief Ed.), N.T. Kharov, G.S. Kryshtab, I.A. Orlov, (Resp. Ed.), L.A. Shoykhet, and N.V. Yaris.

PURPOSE: This collection of articles is intended for scientific and technical workers and for students of schools of higher education specializing in automation, telemechanics, and computing.

COVERAGE: The collection contains papers on the automation of metallurgical, chemical and power engineering and on the development of new instruments, telemechanical units, and a program control system for turret lathes. A bibliography on automatic analysis of solutions containing 86 items: 42 Soviet, 34 English, 5 German, 4 French and 1 Polish, is included. No personalities are mentioned.

AUTOMATION OF INDUSTRIAL PROCESSES

AUTOMATION EQUIPMENT

AUTOMATIC CONTROL

(35

KOROBKO, M.I.; STREL'CHENKO, A.G.; KOROTKEVICH, V.N.; KOZLYUK, V.I.;
TYSHKO, A.I.; ARTYNSKIY, V.M.

Automatic control of thermal processes in an open-hearth furnace.
Avtom.i prib. no.1:9-14 '59. (MIRA 13:10)
(Electronic control) (Open-hearth furnaces)

S/133/60/000/011/004/023
A054/A029

AUTHORS: Korobko, M.I., Candidate of Technical Sciences, Artynskiy, V.M., Engineer

TITLE: Computers Used in Controlling the Thermal Conditions of Open-Hearth Furnaces

PERIODICAL: Stal', 1960, No. 11, pp. 981-984

TEXT: To date trials are made to use computers in controlling the heat operating condition of open-hearth furnaces by regulating automatically the two most important indices of the heat system: the specific heat-absorption of the bath (ΔQ) and the thermal efficiency of the furnace (η). In order to feed the necessary information into the computer, transmitters of gas and air temperature, as well as of temperatures and quantities of the burning products removed from the melting area and of the volume of carbon oxide liberated from the bath, etc., have to be designed and constructed. The КЭТИ (KETI) type computer designed for this purpose is based on the equation of reversed "momentary" heat balance and serves in the first place to complete the intermediary automatic heat-process regulation of the system of open-hearth furnaces (САМП = SAMP system). This system, which is still in the experi-

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