L 50738-65 EWT(m)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) Pf-4 TK/JD/HM
ACCESSION NR: AP5015325 UR/0286/65/000/009/0081/0081
620.115.82

AUTHOR: Yermolov, V. A.; Kazakevich, V. I.; Chukhrov, D. L.; Shlenskiy, V. A.

TITLE: A ... tensile tests. Class 42, No. ...

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 9, 1965, 81

TOPIC TAGS: solder, tensile test, test equipment

ABSTRACT: This Author's Certificate introduces a solder specimen made up of a rod ... tensile tests. The specimen is designed for determining ... nical properties of a solder joint and ... of a definite size which is ... the surface of the rod is an annular groove ... solid solder. On the end of the rod is a continuous groove through which the solder flows after heating of the sample. The rod and the sleeve are threaded together.

ASSOCIATION: Predpriyatiye gosudarstvennogo komiteta po oboronnoy tekhnike SSSR (Enterprise of the State Committee for Defense Technology SSSR)

Card 1/2

L 50738-65
ACCESSION NR: AP5015325

SUBMITTED: 28Sep63 ENCL: 00 SUB CODE: IE

NO REF SOV: 000 OTHER: 000

Card 2/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721230005-1"

KAZAKEVICH, V.M., inzh.; KONDRATYUK, A.P., inzh.

Operating conditions of coupling transformers with the power system in electric power plants. Elek.sta. 29 no.5:46-47 My '58. (MIRA 12:3)

(Electric power plants) (Electric transformers)

L 01083-67 EWT(m)/EWP(j)/T IJP(c) GD/RM
ACC NR: AT6031600 SOURCE CODE: UR/0000/64/000/000/0185/0189

AUTHOR: Yerofeyev, B. V.; Shlyk, V. G.; Kazakevich, V. S.

ORG: none

TITLE: Similarity of the initiating action of salts of metals capable of assuming several valences, in autocatalytic oxidation and polymerization. 1. Comparison of the efficiency of carboxylates differing in the hydrocarbon chain length

SOURCE: Geterogennyye reaktsii i reaktsionnaya sposobnost' (Heterogeneous reactions and reactivity). Minsk, Izd-vo Vysshaya shkolk, 1964, 185-189

TOPIC TAGS: chemical initiation, polymerization rate, autocatalytic oxidation, cobalt, carboxylate, manganese stearate, lead, stearate, styrene, tetralin hydroperoxide, autocatalysis, chemical valence

ABSTRACT: A study has been made of the effect of carboxylates of metals capable of assuming several valences on the polymerization rate of styrene in the presence of tetralin hydroperoxide. The experiments were conducted with several cobalt carboxylates (formiate, acetate, butyrate, caprylate, and stearate), and with manganese or bead stearates. The dependence of the polymerization rate on the hydroperoxide

Card 1/2

L 01083-67
ACC NR: AT6031600

and carboxylate concentration was studied. It was shown that the polymerization rate of styrene, in the presence of hydroperoxide--carboxylate systems, depends both on the nature of the metal and of the anion. The initiating efficiency of the carboxylates increased with the hydrocarbon chain length, that of the metals increased in the order: cobalt < manganese < lead. Thus, the initiating action of the carboxylates considered in polymerization is similar to that in autocatalytic oxidation. A scheme is proposed which explains the initiating action of carboxylates as a result of the substitution of hydroperoxide for acid radicals. Orig. art. has: 3 figures. [BO]

SUB CODE: 07/ SUBM DATE: 12Dec 64/ ORIG REF: 007

Card 2/2 mt

GLADKIKH, P.A.; KHACHATURYAN, S.A.; KAZAKEVICH, V.V., doktor tekhn. nauk, prof., retsenzent; BODNER, V.A., doktor tekhn. nauk, prof., retsenzent; DANILOV, L.N., inzh., red.; DANILIN, L.N., red.izd-va; TIMOFEYEVA, N.V., tekhn. red.

[Preventing and eliminating vibrations in pumping units] Preduprezhdenie i ustranenie kolebanii nagnetatel'nykh ustanovok. Moskva, Izd-vo "Mashinostroenie," 1964. 274 p. (MIRA 17:4)

KAZAKEVICH, V. V.

Kazakevich, V. V. On approximate integration of van der Pol's equation. C. R. (Doklady) Acad. Sci. URSS (N.S.) 48, 467 (1945).

Kazakevich, V. V. Sur l'intégration approchée des systèmes oscillatoires à un degré de liberté. C. R. (Doklady) Acad. Sci. URSS (N.S.) 51, 107–110 (1946).

Kazakevich, V. V. Sur le processus d'établissement de systèmes d'oscillation à un degré de liberté. C. R. (Doklady) Acad. Sci. URSS (N.S.) 49, 486–489 (1945).

In the first paper the author derives an approximate formula for the period of oscillation of the periodic solution of van der Pol's equation $\ddot{x}+\mu(x^2-1)\dot{x}+x=0$ for arbitrary ...

... of these approximate values ... values $\mu=1, 5, 10$ shows an agreement to within 10% with the values obtained by means of graphical analysis by van der Pol. In the other papers the method is extended to treat the general equation $\ddot{x}+f(x, \dot{x})=0$. *R. Bellman.*

Source: Mathematical Reviews, Vol. 8, No. 2

Circuits + Circuit Elements

W.E.

3068

[illegible]

On Approximate Integration for Oscillatory Systems with One Degree of Freedom.– V. V. Kazakevitch (C. R. Acad. Sci. U.R.S.S., 20th Jan. 19[illegible], Vol. [illegible], No. [illegible], pp. [illegible] In French.) A method enabling the building up process, the form and the period of the oscillations of a system to be determined for the case when there are no external perturbations.

1949

KAZAKEVICH, V.V.

Kazakevič, V. V. Multiply valued systems and the simplest dynamical models of clocks. Doklady Akad. Nauk SSSR. (N.S.) 74, 665–668 (1950). (Russian)

Multiply valued systems arise in connection with certain types of clocks and various regulators with elements which have characteristics à la hysteresis. The general type of differential equations arising with a single degree of freedom is $\ddot{x} = F(x, \dot{x})$, where: (a) There is an attached finite open covering of the plane by regions G_i. (b) in each G_i the function F is equal to a certain $f_i(x, \dot{x})$ which satisfies a Lipschitz condition in the region. Related multiply-valued ...

KAZAKEVICH, V. V.

USSR/Mathematics - Speed Regulators Clocks, Escapements — Jan/Feb 51

"Contribution to the Theory of Trip Regulators (Escapements)," V. V. Kazakevich "

"Avtomat i Telemekh" Vol XII, No 1, pp 41-60

Author applies the theory of manifold systems, as developed by him ("Dok Ak Nauk SSSR" Vol LXXIV, No 4, 1950), to analysis of processes in escapements; constructs multi-leaf phase surface of the system and conducts quant investigation. Gives example of the constr of multi-leaf phase surface

187T35

USSR/Mathematics - Speed Regulators (Contd) — Jan/Feb 51

of automatic regulation system in the case where Coulomb friction is present in the sensitive element. Submitted 15 Dec 49; resubmitted 20 Jun 50 after revision.

187T35

KAZAKEVICH, V.V.

SOLODOVNIKOV, V.V.; professor, doktor tekhnicheskikh nauk, redaktor; AYZERMAN, M.A., doktor tekhnicheskikh nauk; BASHKIROV, D.A., kandidat tekhnicheskikh nauk; BROMBERG, P.V., kandidat tekhnicheskikh nauk; VORONOV, A.A., kandidat tekhnicheskikh nauk, dotsent; GOL'DFARB, L.S., doktor tekhnicheskikh nauk, professor; KAZAKEVICH, V.V., doktor tekhnicheskikh nauk; KRASOVSKIY, A.A., kand[redacted]kikh nauk, dotsent; LERNER, A.Ya., kandidat tekhnicheskikh nauk; LETOV, A.M., doktor fiziko-matematicheskikh nauk; professor; MATVEYEV, P.S., inzhener; MIKHAYLOV, F.A., kandidat tekhnicheskikh nauk; PETROV, B.N.; PETROV, V.V., kandidat tekhnicheskikh nauk; POSPELOV, G.S., kandidat tekhnicheskikh nauk, dotsent; TOPCHEYEV, Yu.I., inzhener; ULANOV, G.M., kandidat tekhnicheskikh nauk; KHRAMOY, A.V., kandidat tekhnicheskikh nauk; TSYPKIN, Ya.Z. doktor tekhnicheskikh nauk, professor; LOSSIYEVSKIY, V.L., doktor tekhnicheskikh nauk, professor, retsenzent; TIKHONOV, A.Ya., tekhnicheskiy redaktor

[Fundamentals of automatic control; theory] Osnovy avtomaticheskogo regulirovaniia; teoriia. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1954. 1116 p. (MLRA 8:2)

1. Chlen-korrespondent AN SSSR (for Petrov, B.N.)
(Automatic control)

KAZAKEVICH, V.V. (Moskva).

Use of throttle devices for measuring fluid consumption at low Reynolds numbers. Izv. AN SSSR. Otd. tekh. nauk. no.12:125-128 D '55. (MIRA 9:3)

(Flowmeters)

KAZAKEVICH, V.V.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/1 PG - 150
AUTHOR KAZAKEVIČ V.V.
TITLE On irrelation between phase planes of Raileigh's equation and van-der-Pòl's equation.
PERIODICAL Doklady Akad. Nauk, 107, 521-523 (1956)
reviewed 7/1956

As is well known, by $\dot{y} = z$ and $F(z) = df(z)/dz$ the Raileigh's differential equation $\ddot{y} - \mu f(\dot{y}) + y = 0$ can be transformed to the van-der-Pol's equation $\ddot{z} - \mu F(z)\dot{z} + z = 0$. After a short general consideration the author shows by the example $f(\dot{y}) = \dot{y} - \dot{y}^3$ that the corresponding phase planes show no visible coincidence; e.g. the limit cycles have a very different form.

KAZAKEVICH, V.V.

Characteristics of the excitation of vibrations in clocks. Dokl.AN SSSR 107 no.5:653-655 Ap '56. (MLRA 9:8)

1. Predstavleno akademikom N.N. Bogolyubovym.
(Clocks and watches--Vibration)

KAZAKEVICH, V.V.

20-4-12/60

AUTHOR: Kazakevich, V. V.

TITLE: On Surging in Compressors (O pompazhe v kompressorakh).

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 4, pp. 677-680 (USSR)

ABSTRACT: At first a short report is given on 6 relevant earlier works. The present paper investigates the character of the surging-oscillations and a method for their suppression. The system examined here contains a ventilator, a sucking pipe and a pressing pipe on whose outlet is a regulating resistance in form of a throttle. The author assumes the following: 1) The complicated distributed acoustic system can be replaced by a system with one degree of freedom. 2) The changes pressure in the oscillations are small. Then the motions in the system can be described by a system of two first order differential equations:

$dQ_0/dt = (1/L_a)\left[F(Q_0)-p\right]$, $dp/dt = (1/C_a)\left[Q_0 - \varphi_1(p)\right]$

In this connection $\varphi_1(p)$ signifies the increase in the function: $\varphi(Q_R)$; Ca- the acoustic mobility of the system, L_a-the acoustic mass, and $F(Q_0)=\pi_1(Q_0)-p_0$ applies. By eliminating the time from these equations the differential equation of the integral curves is obtained: $dp/dQ_0 = ((Q_0 - \varphi_1(p))/(F(Q_0)-p))L_a/C_a$. After some transformations expressions for the condition of the static prin-

Card 1/2

SUBMITTED: February 2, 1957

AVAILABLE: Library of Congress

Card 1/2

KAZAKEVICH, V.V.

103-2-9/9

AUTHOR: Rusevich, I. M.

TITLE: Conference on Automatic Control and Computation Engineering (Soveshchaniye po avtomaticheskomu upravleniyu i vychislitel'noy tekhnike)

PERIODICAL: Avtomatika i Telemekhanika, 1958, Vol. 19, Nr 2, pp. 191-194 (USSR)

ABSTRACT: From March 5 - 8, 1957 the conference on automation and computation engineering organized by the All Union Scientific Engineering and Technical Society for Apparatus Building took place. 900 delegates from the Institute of the AN USSR as well as of the AN of the Unions' Republics, universities, research institutes, designing offices and laboratories of the various ministries and authorities took part in it. 40 lectures were held. The opening speech was delivered by M. Ye. Rakovskiy. The president of the organization committee of this conference V. V. Solodovnikov (Central Scientific Research Institute for Complex Automation = TsNIIKA) announced the tasks as well as the program of the conference. In the

Card 1/6

second part of his speech he defined the subject as well as the characteristics of the content of technical cybernetics. A. A. Lypunov indicated the rôle and the importance of cybernetics as scientific basis of a complex automation of production. The following lectures were held on the theory and the foundations of construction of control computors: V. V. Kazakevich spoke on "Principles and circuits of optimum operation control methods". In a common lecture V. V. Solodovniko, A. M. Batkov, A. A. Bredis and P. S. Matveyev (TsNIIKA) dealt with the "Present Stage of the Theory of Optimum Dynamic Systems Subjected to Arbitrary Effects". L. T. Kuzin showed the use of the Z-transformation apparatus for the analysis and synthesis of the automation systems with numerical computation devices. A. M. Batkov spoke on the new way of using modelling electronic plants (electronic simulation) for the determination of the basic and statistical characteristics - the correlation function and the dispersion of a non-standardized arbitrary magnitude at the output of the automation system according to given characteristics of arbitrary effects at the input. Yu. A. Shreyder spoke on the principles of construction of so-called "self-informing" control apparatus, the

103-2-9/9

Conference on Automatic Control and Computation Engineering

basic property of which is the capability to find the optimum way of control by means of accumulated experiences in operation. - V. I. Dikushin, Member of the Academy, (Scientific Research and Experimental Institute for Machining Tools) spoke on the construction of systems for a preset control of machine tools. The lecture of E. Z. Lyubimskiy, S. S. Kamynin and V. S. Shtarkman (Institute for Mathematics imeni Steklov AN USSR) dealt with optimum information coding in automation and multistep automation schemes for production processes. M. P. Shura-Bura (Institute for Mathematics imeni Steklov AN USSR) spoke on the possibility of using the means of computation engineering for a transformation of any informations including those of automatic translation from one language into the other. N. V. Korol'kov, Ye. I. Mamonov and Yu. I. Sharapov spoke on the achievements in the field of quick, reliable, economical and small computor elements. On the utilization of these elements in the circuits of computors spoke V. A. Zimin and L. I. Gutenmakher. - V. I. Ryzhov, N. V. Trubnikov and A. K. Zavolokin, as well as Ye. M. Baskakov spoke on the input and output devices of computors. Yu. S.

Card 3/6

103-2-9/9

Conference on Automatic Control and Computation Engineering

Val'denberg held a lecture on a specialized mathematical machine of continuous operation for the solution of integral equations of Fredholm and Volterra's first and second type, as they often occur in control problems. - Yu. V. Novikov (IAT AN USSR) spoke on the new computor created in the IAT AN USSR (magnetic correlograph) for the automatic computation of correlation functions. - I. M. Vitenberg spoke on the modelling electronic apparatus for the automatic finding of a solution for a problem with a given system of equations. - F. V. Mayorov and Ye. P. Zhidkov spoke on the mathematical foundations of numerical differential analyzers (TsDa) as well as on their use as control apparatus. - L. I. Gutenmakher spoke on the prospects of using information- and statistical machines of new design for control systems.

AVAILABLE: Library of Congress

Card 4/6

103-2-9/9

Conference on Automatic Control and Computation Engineering

The conference took place in Moscow from March 5 - 8, 1957. A number of lectures dealt with examples from the field of application of computation apparatus for the control of real production objects Yu. Ye. Yefroymovich (Central Laboratory for Automation), V. Yu. Kaganov (Central Laboratory for Automation, A. B Chelyustkin (IAT AS USSR) and P. N. Kopay-Gora spoke on the use of computation apparatus for the control of basic objects in metallurgy (furnaces, arc furnaces, rolling mills). D. T. Vasil'yev and L. N. Fitsner spoke on computators for the determination of the most suitable sequence of cuts in metalworking industry. Up to 20 different quantities determining the sequence of cuts can be introduced into the

Card 5/6

103-2-9/9

Conference on Automatic Control and Computation Engineering

machine and when some of these magnitudes are given the demanded optimum parameter can be computed within 2 - 3 minutes. Ya. A. Khetagurov reported on a numerical system for the control of a machine tool. - The conference regards it necessary to organize special groups within the TsNIIKA (Central Scientific Research Institute for Complex Automation), the NII and KB (Scientific Research Institute and Construction Bureau), at the ministries as well as within the organization of the AS USSR. These groups should be concerned with the problems of technical cybernetics. It was decided to have organized an All-Union Conference for Cybernetics by the All-Union Scientific Engineering and Technical Society for Apparatus Building in collaboration with the AS USSR.

AVAILABLE: Library of Congress

1. Automation-Conference

Card 6/6

USCOMM-DC-54858

PHASE I BOOK EXPLOITATION SOV/3486

Kazakevich, V. V.

Avtokolebaniya (pompazh) v ventilyatorakh i kompressorakh (Self-excited Oscillations /Pulsation/ in Ventilators and Compressors) Moscow, Mashgiz, 1959. 191 p. 6,000 copies printed.

Sponsoring Agency: Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti.

Tech. Ed.: S. M. Lazarev.

PURPOSE: This monograph may be used by engineers and technicians, designers and application engineers, scientific workers, and students of advanced courses in the appropriate fields in schools of higher technical education.

COVERAGE: The theory developed in this book permits one to explain basic phenomena occurring in self-excited oscillations, shows the causes for differences in the character of oscillations in various types of fans, and evaluates the effect of various factors on the domain of oscillating regimes. This

Card 1/6

theory enables one to predict new phenomena. It shows in particular that oscillations may take place not only in regimes corresponding to ascending branches of the characteristic curves, but also in regimes corresponding to the descending branches, which up till now were considered stable. The book also shows a method of constructing (directly from the fan and system characteristics) curves which characterize the oscillations. The new theory also makes it possible to eliminate oscillations by introducing a regulating system with feedback, which affects the position of the throttle and distributor. There are 13 references: 11 Soviet, 1 English, and 1 German.

TABLE OF CONTENTS:

Introduction 5

Ch. I. Equations of Motion of a Small-discharge Compressor and Their Analysis 12

Derivation of the equations of motion 12

Reduction of a system of two differential equations of the first order to one equation of the second order 16

Condition for self-excitation of oscillations and their frequencies 20

Effect of external conditions on oscillating characteristics 25

Card 2/6

Behavior of a system "on a small scale"(domains of self-excitation and static stability) 32
Analytical determination of the amplitude and period of self-excited oscillations 35
Transformation of the equation of motion to Rayleigh's form 39
Investigation of a system "on a large scale." Soft and hard excitation of oscillations 45
Domains of stability and instability 68
Unstable operation on the descending branches of the compressor characteristic 70
More complex cases of oscillation 74

Ch. II. Method of Integrating the Oscillation Equation Directly From the Fan and System Characteristics 83
Basis of the method 83
Determining the period of oscillations 89
Physical meaning of the phase plane 92
Investigation of oscillation in a specific system.
The effect on the character of oscillation brought about by a change in position of the operating point on the fan characteristic 93

Determination of the period of oscillations 101
Effect of a change in the geometrical dimensions of the system on the character of oscillation 102
Construction of curves showing pressure and discharge as functions of time 117
More complex cases where pumping arises 122
Investigation of motions in a system where several points of intersection between compressor and network exist 123

Ch. III. Oscillations in Systems With a Large-discharge Compressor 125
Derivation of equations of motion 125
Analysis of the equations of motion 129
Conditions of soft and hard excitation of oscillations according to Lyapunov 131
Oscillation in systems containing a throttling valve in the suction line 133
Derivation of equations of motion 133
Construction of the compressor characteristic 136
Phase plane of the system 140
Derivation of the stability condition 142

Self-excited Oscillations (Cont.) SOV/3486

Stability of a system in which the air volume is located at positions other than at the ends of the line 146
Investigation of motion in systems in the presence of hysteresis and discontinuous compressor characteristics 149
Comparison of theoretical and experimental results 152
Determination of the frequency of oscillations as a function of the geometrical dimensions of the system and number of revolutions per minute 153
Determination of the limit of the domain of stability 161
Construction of the phase plane 163
Experimental investigations performed on axial compressors, especially for checking theory 165
Methods of influencing oscillations 174
Regulation of the discharge throttle according to $p^{\cdot}\delta$ 177
Regulation of the discharge throttle according to q_0 179
Regulation of the distributor according to $p^{\cdot}\delta$ 180
Measurements required in conducting experiments 181

Card 5/6

Conclusions 182

Appendix. Mechanical Model of a System Representing a Fan 184

Bibliography 189

AVAILABLE: Library of Congress

Card 6/6

AC/fal
5-27-60

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721230005-1"

KAZAKEVICH, V.V.

28(1) SOV/30-59-1-48/57

AUTHOR: Meresanov, I. S.

TITLE: Development of the Theory and the Application of Discreet Automatic Systems (Razvitiye teorii i primeneniy diskretnykh avtomaticheskikh sistem)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 1, pp 138-139 (USSR)

ABSTRACT: The conference dealing with this problem took place in Moscow from September 22 to 26, 1958 and was opened by V. A. Trapeznikov, chairman of the Natsional'nyy komitet SSSR po avtomaticheskomu upravleniyu (National Committee of the USSR for Automatic Control). In the Plenary Meeting Ya. Z. Tsypkin reported on discreet automatic systems and their development prospects. The work of the conference was undertaken by 5 sections. Reports were held by:).
G. P. Tartakovskiy and V. F. Parov reported on new investigation results in the case of pulse systems with variable parameters.
Fan Ch'ung-wui dealt in his report with his successful procedures of analysis of pulse systems with several elements.
F. M. Kilin spoke about the problem of an increase of the perturbation stability of the systems.

Card 1/3

Ya. Z. Tsypkin investigated the possibilities of pulse systems.
L. A. Krasovskiy investigated one of the possible ways of constructing an automatic control system with a discreet correcting device.
R. A. Kragius analysed pulse systems.
L. V. Fyxkin investigated the conditions of eigen oscillations (avtokolebaniye) in a system with wide range pulse modulation.
Yu. V. Dolgolenko reported on the method of determining parameters of a boundary cycle for an extreme system.
V. V. Kazakevich dealt with the results of approximation calculation methods of extreme systems.
A. A. Fel'dbaum investigated the influence of perturbations.
A. G. Butkovskiy and S. N. Domanitskiy reported on the construction of optimum control systems for objects with retardation.
G. K. Natshafeva investigated methods of determining the maximum [illegible] effect of control systems.
O. G. Varshavskiy spoke about the construction of an automatic machine for objects with retardation which permits the best possible control systems.

Card 2/3

M. A. Gavrilov analysed modern telemechanical equipment from the viewpoint of the so-called "finite automatic machines" (consisting of systems of a finite number of elements).
P. P. Parkhomenko reported on the effect and construction of a special logical machine for the analysis of relay orders.
Yu. Ya. Bahllevskiy investigated accurate "finite automatic machines" which in the case of an unvariable structure furnish arbitrary items of several arguments.
G. K. Berends and [illegible] reported on a pneumatic system of elements of "finite automatic machines" with the logical elements described as "not", "and", "or" by means of which further logical functions can be put into practice.
The participants in the conference considered the technical working out of the papers presented to them insufficient. In the last session the heads of the committees summarized the results obtained at the conference and briefly mentioned the important tasks in further developing the theory and the application of discreet automatic systems.

Card 3/3

KAZAKEVICH, V.V.

Theory of escapement mechanisms with consideration of multiple-valued characteristics. Avtom. upr. i vych. tekh. no.2:167-220 '59. (MIRA 13:2)

(Time measurements)

KAZAKEVICH, V.V.; OSTROVSKIY, G.M.

Drying friction in a servomotor as a cause of self-oscillations in control units. Avtom. upr. i vych. tekh. no.2:296-317 '59.
(MIRA 13:2)

(Servomechanisms)

SOV/24-59-4-15/33

AUTHORS: Bodner, V.A. and Kazakevich, V.V. (Moscow)

TITLE: Stability of Compressors as Non-linear Elements in Extended Systems

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1959, Nr 4, pp 116-125 (USSR)

ABSTRACT: The compressor is one supplying compressed air to remote points through narrow pipes; the compressor is controlled by the pressure prevailing at a fairly distant point. The equations of motion (taken from Ref 1) are (1.1), where u, p and ρ are, respectively, the speed, pressure and density, d is the diameter of the pipe, α and m are coefficients representing viscous resistance and γ is the ratio of the specific heats. It is assumed that the pipe (Figure 1) is loaded at the ends by acoustic impedances Z_1 and Z_2 ; the boundary conditions are then (1.2), where p_1 and p_2 are the total pressures at the input and the output, respectively; p_{01} and p_{02} are the constant components of those

Card 1/5

SOV/24-59-4-15/33

Stability of Compressors as Non-linear Elements in Extended Systems

pressures; Q_1 and Q_2 are flows (in volume terms) and q_1 and q_2 are excess flows (again in volume terms). The equations are linearized (Ref 1) as (1.3 and (1.4), with the symbols defined at the top of p 117; the boundary conditions are put as (1.5). It is assumed that h_{11} and h_{21} are constant for the purposes of examining the stability, though this is not so in unstable modes (variation in $\partial F/\partial Q_2$ is used as a test for instability). In the second section, the equations are solved using the form given by Eqs (2.1) and (2.2), which with (1.3) and (1.4) give (2.3) for the input pipe and (2.4) for the output pipe; the corresponding solutions are (2.5) and (2.6), where Z_{11} and Z_{22} are the wave impedances of the pipes. Eq (2.7) gives the constants A and B ; this system has a solution only if (2.8) is complied with. The two equations derived from (2.8) are (2.9).

Card 2/5

SOV/24-59-4-15/33

Stability of Compressors as Non-linear Elements in Extended Systems

Then (2.8) is put as (2.10), with $E_{11} = -E_{12}$.

In section 3, the compressor is assumed to be connected to a pipe terminated by an impedance Z_2 , with an impedance Z_1 at the input by the compressor (here $l_1 = 0$) . The substitutions at the top of p 119 are then made, to give (3.1), which then splits up into Eqs (3.2) and (3.3); these equations show that the natural frequencies of the system depend only on the pipe and terminating impedance and that there are two series of frequencies given by Eq (3.4). First, the roots corresponding to the + sign are considered, with $|Z_2| \ll Z_{22}$; we then have Eq (3.5), which leads to a contradiction. Therefore, $|Z_2| \gg Z_{22}$ and we have Eq (3.6). Then the -sign is taken, again with $|Z_2| \ll Z_{22}$; this gives Eq (3.7). The case $|Z_2| \gg Z_{22}$ gives Eq (3.8). This argument shows that the minus sign must

Card 3/5

be taken and Eq (3.9) gives the frequencies.
The subsequent analysis deals with the stability limits, which are given by Eq (3.13); the case $\psi = 0$ is considered in detail. Here, Eq (3.12) becomes (3.15), which implies Eqs (3.16) and (3.17); these define, respectively, the regions of dynamic and static stability. Figure 2 illustrates this. Figure 3 shows lines of constant decrement.
The next section deals with the effects of radiation from the open end of the pipe, assumed fitted with an infinite flange. Figure 4 illustrates the results in general terms. Eqs (3.19) onwards deal with the effects of an impedance Z_1 connected at the compressor end; at no point can the system then become absolutely unstable. The system is, respectively, least and most stable when the two equations for R_1 apply. The final two sections deal with other special cases, the significance of which

16(1) SOV/20-126-2-17/64

AUTHOR: Kazakevich, V. V.

TITLE: On the Monotonic Stability of Invariant Points (O monotonnoy ustoychivosti invariantnykh tochek)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 2, pp 287-290 (USSR)

ABSTRACT: The system of equations $\varphi_i(x_1,\dots,x_n)=f_i(x_1^{(1)},\dots,x_n^{(1)})$, $i=1,\dots,n$ is assumed to define the unique transformation T, according to which it is possible to pass from point $P(x_1,\dots,x_n)$ to point $P_1(x_1^{(1)},\dots,x_n^{(1)})$: $P_1=T(P)$. The above-mentioned equations are assumed to determine the invariant point $P^*(x_1^*,\dots,x_n^*)$. The following then holds: $f_i(x_1^*,\dots,x_n^*)=\varphi_i(x_1^*,\dots,x_n^*)$. The author determines the monotonic stability with respect to $x_1,x_2,\dots,x_k$ $(k\leqslant n)$. The condition of monotonic stability is, of course, more rigorous than that of asymptotic stability, and it is also of practical use, for many problems of automatic control are reduced to a point transformation of a straight line into a straight line or, in

Card 1/3

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721230005-1"

general cases, of a space into a space. Especially the problem of the exact determination of periodic motions in a system serving the purpose of automatic control may be reduced to such a transformation, and the application of the criterion of monotonic stability is found to be of use in this case. The author derives the criterion of monotonic stability by basing on the assumption that f_i and φ_i are holomorphic in the neighborhood of the invariant point P^*. The corresponding calculations are followed step by step. $x_i = x_i^* + a_i$ is put. The condition of monotonic stability demands that $a_p = 0$ ($p = k+1, k+2, \ldots, n$) holds, which must hold also for all transformations T. Thus, the problem of monotonic stability is reduced to the condition of positivity and definedness of a quadratic form of k variables while at the same time the last-mentioned conditions are satisfied. The invariant point of the initially written down system of n equations with n variables is monotonically stable if the inequalities

$$\begin{vmatrix} D_{11} \ldots D_{1k} \\ \ldots\ldots \\ D_{k1} \ldots D_{kk} \end{vmatrix} > 0, \quad \begin{vmatrix} D_{11} \ldots\ldots D_{1,k-1} \\ \ldots\ldots\ldots\ldots \\ D_{k-1,1} \ldots D_{k-1,k-1} \end{vmatrix} > 0, \ldots\ldots, \quad \begin{vmatrix} D_{11} & D_{12} \\ D_{21} & D_{22} \end{vmatrix} > 0$$

Card 2/3

and the above written down conditions are satisfied. Thus the here investigated monotonic stability requires that several initial conditions ($a_p = 0$) be satisfied, like in the case of the monotonic stability of a system of differential equations. In conclusion, the special cases $k = 1$ and $k = n$ are investigated. There are 6 references, 5 of which are Soviet.

PRESENTED: December 31, 1958 by N. N. Bogolyubov, Academician

SUBMITTED: December 30, 1958

24 (0)

AUTHOR: Kazakevich, V. V. SOV/20-126-3-16/69

TITLE: On the Process of the Extreme Regulation of Inert Objects in the Presence of Perturbations (O protsesse ekstremal'nogo regulirovaniya inertsionnykh ob"yektov pri nalichii vozmushcheniy)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 3, pp 517-520 (USSR)

ABSTRACT: In the present paper the inexactitude of regulation caused by the inertia of the objects to be regulated is briefly described, and it is shown that the exactness of regulation depends also on the level of the perturbation. Investigation of the methods of reducing the influence of the inertia of objects and for the attenuation of the influence of perturbations are then given as the subject to be dealt with by the present paper. The investigation is based on an inhomogeneous differential equation of the first order, in which the input- and output quantities x and y of the objects to be regulated as well as their time constant T are put into relation. The solutions given for this differential equation are limited to a range of x and y, in which T $\approx$ const. From these solutions the

Card 1/2

On the Process of the Extreme Regulation of Inert Objects in the Presence of Perturbations SOV/20-126-3-16/69

unknown quantities T_i and a_i are calculated. For the case of monotonic oscillations, a similar differential equation is then given and its unknown is determined. On the basis of results hitherto obtained, the process of regulation is then investigated with the help of a diagram (Fig 1). In this connection, the transition process is described with formula (1). The inertialess objects are then briefly investigated, after which the non-monotonic oscillations are dealt with. Two measuring arrangements (Figs 2, 3) for objects of little inertia are then described. In conclusion, determination of the direction of set point displacement by means of these instruments is dealt with in detail. There are 3 figures and 6 references, 4 of which are Soviet.

PRESENTED: December 31, 1958, by N. N. Bogolyubov, Academician

SUBMITTED: December 30, 1958

Card 2/2

KAZAKEVICH, V.V.

report to be presented at the 1st Intl Congress of the Intl Federation of Automatic Control, 25 Jun-5 Jul 1960, Moscow, USSR.

BYKHOVETSKIY, M. L. - "Ultra stability in electronic calculating devices in the solution of nonlinear equations in indefinite form"
CHELYUSTKIN, A. B. - "Use of calculating devices in systems for the automatic control of rolling mills"
CHICHINADZE, V. K. - "Concerning some problems of the organization of self-adjusting and self-teaching systems of automatic control, based on principles of random search"
DAVYDOV, N. I. - "Development of automatic control systems for boiler units"
DUDNIKOV, Ye. G. - "Determination of optimum adjustments of industrial automatic regulation systems according to initial data obtained from experience"
DUR'YE, A. I., and ROZENVASSER, E. N. - "Methods of organizing Lyapunov functions in the theory of nonlinear regulating systems"
DRUZHININ, N. N. - "Balanced regulation and inter-communications of a multi-motor electric drive and technology in continuous rolling mills"
FEL'DBAUM, A. A. - "Problems of statistical theory of automatic optimization systems"
FEYGIN, V. I. - "Automation of a reversible cold rolling mill for nonferrous metals"
FILIPPOV, A. F. - "Application of the theory of differential equations with a discontinuous right side to nonlinear problems of automatic regulation"
GAVRILOV, M.A. - "Structural surplus and operational reliability of relay devices"
GANKIN, M. Z. - "Automation of irrigation systems"
GERTSENBERG, G. R., KASHTELYAN, V. E., KOSTENKO, M. P., NEYMAN, L. R., and SIRKY, N. S. - "Power regulation of disturbance and problems of the stability of electric power systems"
GINZBURG, S. A. - "Logical method of synthesis of functional converters"
IL'IN, V. A. - "Methods of transmission of information and the structure of telemechanical systems for dispersed structures"
INOSOV, V. L., and LUTSKIY (fnu) - "The code-impulse system of tele-measurement for dispatched operations of trunk-line gas pipe lines"
IVAKHNENKO, A.G. - "Concerning the application of the theory of combined regulation systems for cybernetic adaptation systems"
KARANDEYEV, K. B., and SHTAMBERGER, G. A. - "A quasi-equilibrated bridge as an element in a system of automatic control"
KAZAKEVICH, V. V. - "Concerning the process of extra regulation of inert objects in the presence of disturbance"
KAZAKOV, I. E. - "Some problems of the theory of statistical linearization and its application"
KILIN, F. M. - "Some problems of the theory of impulse systems with time selectors"
KOBRINSKIY, A. E., BOLKHOVITIN, S. V., VOSKOBOYNIKOV, L.M., IOFFE, D. M., POLYAN, E. P., POPOV, B. P., SLAVUTSKIY, Ya. L., SYSIN, A. Ya., and YAKOBSON, Ya. S. - "The problem of bioelectric control"
KOLOMIYETS, B.T. - "New types of photo resistances and their field of use"
KOROBKO, M.I., MIKHNOVICH, B. G., and SHUMILOV, K. A. - "System of automatic control and regulation of blast distribution in the tuyeres of blast furnace"
KOROBOCHKIN, B. L. - "Investigation of the dynamics of the hydraulic duct of a copying lathe"
KRASOVSKIY, A. A. - "Dynamics of continuous systems of automatic regulation with extra self-adjustment of corrective devices"
KRASOVSKIY, N. N. - "Concerning the selection of parameters of optimum stability systems"
KUKHTENKO, A. I. - "The dynamics of devices imitating living organisms"
KULEBAKIN, V. S. - "The invariant theory of automatic regulation and control systems"
LANIN, I. D. - "Pneumatic calculating devices as a means of insuring the reliability of complex automation systems"
LAZAREV, V. [illegible] and PARKHOMENKO, P.P. - "Mechanization of processes of analysis and synthesis of the structure of relay devices"

KAZAKEVICH, V.V.

PHASE I BOOK EXPLOITATION SOV/4275

Avtomaticheskoye upravleniye i vychislitel'naya tekhnika, vyp. 3 (Automatic Control and Computer Techniques, No. 3) Moscow, Mashgiz, 1960. 439 p. Errata slip inserted. 7,000 copies printed.

Ed. of Publishing House: G.F. Polyakov; Tech. Ed.: T.F. Sokolova; Managing Ed. for Literature on Machine Building and Instrument Making (Mashgiz): N.V. Pokrovskiy, Engineer; Editorial Board: V.V. Solodovnikov, Doctor of Technical Sciences, Professor (Chairman), N.N. Bogolyubov, Academician, A.Yu. Ishlinskiy, Academician, Ukrainian SSR, V.V. Kazakevich, Doctor of Technical Sciences, Professor (Deputy Chairman), A.A. Lyapunov, Doctor of Physics and Mathematics, Professor, B.N. Petrov, Corresponding Member, Academy of Sciences USSR, Ye.P. Popov, Doctor of Technical Sciences, Professor, G.S. Pospelov, Doctor of Techical Sciences, Professor, B.A. Ryabov, Doctor of Technical Sciences, Professor, B.V. Anisimov, Candidate of Technical Sciences, Docent, V.V. Petrov, Doctor of Technical Sciences, Docent, V.N. Plotnikov, Candidate of Technical Sciences, Docent (Scientific Secretary), V.B. Ushakov, Doctor of Technical Sciences.

PURPOSE: This book is intended for scientific workers, engineers, and aspirants working in the field of automatic control.

COVERAGE: The book is the third collection of reports read at the seminar on automatic control and computer engineering of the NTO priborostroyeniya (Scientific and Technical Society for Instrument Making), the MVTU im. Baumana (Moscow Higher Technical School imeni Bauman), and the MAI im. Ordzhonikidze (Moscow "Order of Lenin" Aviation Institute imeni Ordzhonikidze). It contains papers on current topics in automatic control and computer engineering which, according to the author, are significant for the solution of problems involved in the complex automation of industrial processes by means of control machines and includes discussion of the design of linear and nonlinear automatic control systems. The book covers some questions related to the dynamics of such systems, ways of increasing operational speed, and means of obtaining optimum transient processes. Automatic control systems involving discrete computers, systems with variable parameters, sampled-data control systems, the dynamic accuracy of these systems during random motions, and the theory of sampled-data systems are discussed. No personalities are mentioned. References are found at the end of each article.

Potapov, M.D. On the Nonstationary Properties of Sampled-Data Systems 218

Shatalov, A.S. Engineering Methods of the Linear Theory of Control Systems With Variable Parameters 233

Batkov, A.M. Certain Problems of the Theory of Linear Systems With Variable Parameters During Random Actions 302

Ostrovskiy, G.M. On a Method of Improving the Quality of a Control System by Means of Nonlinear and Computer Devices 373

Pavlov, A.A., V.F. Poputsillo. Design of Simple Optimal Relay Systems of the Second Order 419

Bodner, V.A., V.V. Kazakevich. Stability of Self-Oscillations of Acoustic Systems With Compressors and the Suppression of Self-Oscillations by Means of Feedbacks 445

AVAILABLE: Library of Congress

Card 4/4

(3)

AC/rb/afm
9/21/60

KAZAKEVICH, V.V.

PHASE I BOOK EXPLOITATION SOV/4411

Konferentsiya po voprosam teorii i primeneniya diskretnykh avtomaticheskikh sistem, Moscow, 1958

Teoriya i primeneniye diskretnykh avtomaticheskikh sistem; trudy konferentsii (Theory and Application of Discrete Automatic Systems; Transactions of the Conference) Moscow, AN SSSR, 1960. 572 p. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Natsional'nyy komitet SSSR po avtomaticheskomu upravleniyu. Institut avtomatiki i telemekhaniki.

Editorial Board: M.A. Gavrilov, Doctor of Technical Sciences, Yu.V. Dolgolenko, Doctor of Technical Sciences, V.A. Kotel'nikov, Candidate of Technical Sciences, A.Ya. Lerner, Doctor of Technical Sciences, I.S. Morosanov (Scientific Secretary), G.S. Pospelov, Doctor of Technical Sciences, A.A. Fel'dbaum, Doctor of Technical Sciences, A.V. Khramoy, Candidate of Technical Sciences, and Ya.Z. Tsypkin, Doctor of Technical Sciences; Resp. Ed.: Ya.Z. Tsypkin, Doctor of Technical Sciences; Ed. of Publishing House: M.L. Podgoyetskiy; Tech. Ed.: S.G. Markovich.

PURPOSE: These transactions are intended for the members of the conference and other specialists in automatic control.

COVERAGE: The Conference on the Problems of Theory and Application of Discrete Automatic Systems took place in Moscow from September 22 to 26, 1958. It was the first conference devoted to discussions of the present status of the theory and techniques of discrete automatic systems and to planning for future development. The papers discussed at the conference have been divided into four groups. In the first group optimization switching circuits are discussed as well as methods of relay control systems, in particular plant lag control systems in which are realized optimal processes as to quick response. The second group of papers is devoted to the analysis and synthesis of pulse systems with variable parameters, of pulse systems with several pulse components, to the study of self-oscillation phenomena in nonlinear pulse systems, and to the methods of calculating linear pulse systems. Problems of simulating pulse systems and descriptions of some pulse regulators have also been included. The third group of papers deals with digital systems. Problems of using elements of digital technique and digital computers for the automation of various fields of engineering, i.e., power engineering, mining, radio communication, metallurgy, etc., are discussed. Problems of analog-digital conversion and vice versa as well as problems of developing specialized functional converters have been included in this group. The fourth group of papers includes theoretical elements and certain practical applications of the simplest types of self-adjusting systems, optimalizing control systems, which are developed as relay, pulse and digital devices. Here are also found papers describing various methods of investigating steady state conditions in optimalizing systems, results of studying the effects of random factors on the process of automatic scanning, and examples of existing optimalizing control systems. Some of the more interesting communications and observations made during the discussion of the various conference papers have also been included in the Transactions. Personalities and references accompany most of the papers.

Basilevskiy, Yu.Ya. (Moscow). Solution of Time Logical Equations by the Reduction Method 379
The author examines conditions and the method of solution of a time equation given in the form of an implicit function. There is 1 Soviet reference.

IV. OPTIMALIZING CONTROL SYSTEMS

Kazakevich, V.V. (Moscow). Investigation of Nonlinear Processes in an Optimalizing Controller 387
The investigation of optimalizing control systems is connected with solving systems of nonlinear differential equations. The author applies the Galerkin method of investigation. There is 1 Soviet reference.

Dolgolenko, Yu.V. (Leningrad). Accurate Determination of Self-Oscillation Conditions in Relay Systems of Optimalizing Control 399
The author presents his method of accurate calculations and compares it with the results obtained by the approximate method of harmonic balance. There are 2 references, both Soviet.

KAZAKEVICH, V. V.

PHASE I BOOK EXPLOITATION SOV/4411

Konferentsiya po voprosam teorii i primeneniya diskretnykh avtomaticheskikh sistem, Moscow, 1958

Teoriya i primeneniye diskretnykh avtomaticheskikh sistem; trudy konferentsii (Theory and Application of Discrete Automatic Systems; Transactions of the Conference) Moscow, AN SSSR, 1960. 574 p. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Natsional'nyy komitet SSSR po avtomaticheskomu upravleniyu. Institut avtomatiki i telemekhaniki.

Editorial Board: M.A. Gavrilov, Doctor of Technical Sciences, Yu.V. Dolgolenko, Doctor of Technical Sciences, V.A. Kotel'nikov, Candidate of Technical Sciences, A.Ya. Lerner, Doctor of Technical Sciences, I.S. Morosanov (Scientific Secretary), G.S. Pospelov, Doctor of Technical Sciences, A.A. Fel'dbaum, Doctor of Technical Sciences, A.V. Khramoy, Candidate of Technical Sciences, and Ya.Z. Tsypkin, Doctor of Technical Sciences; Resp. Ed.: Ya.Z. Tsypkin, Doctor of Technical Sciences; Ed. of Publishing House: M.L. Podgoyetskiy; Tech. Ed.: S.G. Markovich.

PURPOSE: These transactions are intended for the members of the conference and other specialists in automatic control.

COVERAGE: The Conference on the Problems of Theory and Application of Discrete Automatic Systems took place in Moscow from September 22 to 26, 1958. It was the first conference devoted to discussions of the present status of the theory and techniques of discrete automatic systems and to planning for future development. The papers discussed at the conference have been divided into four groups. In the first group optimization switching circuits are discussed as well as methods of relay control systems, in particular plant lag control systems in which are realized optimal processes as to quick response. The second group of papers is devoted to the analysis and synthesis of pulse systems with variable parameters, of pulse systems with several pulse components, to the study of self-oscillation phenomena in nonlinear pulse systems, and to the methods of calculating linear pulse systems. Problems of simulating pulse systems and descriptions of some pulse regulators have also been included. The third group of papers deals with digital systems. Problems of using elements of digital technique and digital computers for the automation of various fields of engineering, i.e., power engineering, mining, radio communication, metallurgy, etc., are discussed. Problems of analog-digital conversion and vice versa as well as problems of developing specialized functional converters have been included in this group. The fourth group of papers includes theoretical elements and certain practical applications of the simplest types of self-adjusting systems, optimalizing control systems, which are developed as relay, pulse and digital devices. Here are also found papers describing various methods of investigating steady state conditions in optimalizing systems, results of studying the effects of random factors on the process of automatic scanning, and examples of existing optimalizing control systems. Some of the more interesting communications and observations made during the discussion of the various conference papers have also been included in the Transactions. Personalities and references accompany most of the papers.

Kirillov, O.I. (Moscow). Automatic Single-Action Minimizer in Discrete Systems of Automatic Optimization 534

The author defines the problem of automatic optimization as the process of establishing a minimum value for a certain input quantity ε through automatic scanning. This process is a single-action one and the methods used are the same as those discussed in the paper delivered by R.I. Stakhovskiy (p.505). The author considers the method of the quickest triggering as the most economical. He describes the practicable equipment for developing this type of automatic minimizer.

Eskin, M.G. (Moscow). Optimalizing Systems of Turbine Drilling With Discrete Devices 544

The problem consists of establishing a maximum drilling speed for a given load on the chisel, its technological conditions, and a given stratum. The author describes a structural scheme of the optimalizing control system for a turbine drilling installation. There are no references.

Kazakevich, V.V., R.V. Kornilov, and N.G. Khristoforov. Electronic Optimalizing Controller 558

The authors examine and give a detailed description of the peak-holding device method of optimalizing control. There are 7 references: 5 Soviet (including 1 translation) and 2 English.

28368
S/124/61/000/008/006/042
A001/A101

16.4000 (1121, 1132, 1013)

AUTHOR: Kazakevich, V.V.

TITLE: On the process of extremum controlling of inertial objects at the presence of disturbances

PERIODICAL: Referativnyy zhurnal. Mekhanika, no. 8, 1961, 13, abstract 8A123 (Mezhdunar. federatsiya po avtomat. upr. I Mezhdunar. kongress po avtomat. upr., Moscow, AN SSSR, 1960, 19 pp, ill.)

TEXT: The author considers a method of reducing the effect of inertness of an object on the process of experimental step regulation. Inertness of an object is described by a linear differential operator with an extremal function in the right-hand side. The method consists in the discrete measuring of the output magnitude of the object or its derivatives within the "step" of regulation and in the forecasting of the steady value of the output magnitude for the given step. The forecasting of the steady value is conducted on the basis of the form of the solution of the linear differential equation and the results of discrete measurements of the output magnitude, without allowance for random errors of these measurements.

A. Krasovskiy

[Abstracter's note: Complete translation]

Card 1/1

26159

16,8000(1121,1132,1344)

S/044/61/000/005/022/025
C111/C444

AUTHOR: Kazakevich, V. V.

TITLE: A study of non-linear processes in an extremal control system

PERIODICAL: Referativnyy zhurnal, Matematika, no. 5, 1961, 27, abstract 5V181. ("Teoriya i primineniye diskretn. aotomat. sistem." M., ANSSSR, 1960, 387 - 398)

TEXT: The Galerkin method is applied to the study of extremal controls, which is connected with the solution of systems of non-linear ordinary differential equations. For systems the object of which is described by a linear differential equation of first or second order, the author uses the following solution set-up:

$$y = b + \sum_{i=1}^{\infty} (A_i \sin i\omega x + B_i \cos i\omega x);$$

for systems with non linear objects, he uses the set-up:

$$y = b - \Delta_1 \sin^2(\omega x + \varphi).$$

Various special cases are considered. Graphical representations of the

Card 1/2

26159

A study of non-linear processes... S/044/61/000/005/022/025
C111/C444

solutions are given.
(Abstracter's note: Complete translation.)

Card 2/2

33568
S/194/61/000/012/052/097
D256/D303

26.2120
26.2190

AUTHORS: Bodner, V. A. and Kazakevich, V. V.

TITLE: Self-oscillations of acoustical systems containing compressors and their suppression using feedback systems

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 12, 1961, 53, abstract 12V473 (Avtomat. upr. i vychisl. tekhn. no. 3, M., Mashgiz, 1960, 445-490)

TEXT: Self-oscillations of air pressure and the rate of flow in ventilators, compressors and turbo-jet engines (pumps) render their operation more difficult or in certain circumstances even impossible. The oscillation frequency and intensity depend upon the following factors: The characteristics of the compressor, the length and shape of the inlet and outlet tubes, the acoustic load at the end of the tubes and the steady flow parameters. A theory of the compression processes is presented, considering the compressor with the attached network as an acoustical distribution system by

Card 1/3

33568
S/194/61/000/012/052/097
D256/D303

Self-oscillations of ...

substituting an equivalent active non-linear resistance for the compressor, acoustical distribution systems for the tubes and localized resistances for volumes and chokes. Assuming a small increase of the parameters of flow, the equations of hydrodynamics and the state equations are reduced to a linear form corresponding to a wave equation including dissipation forces. The non-linearity of the compressor characteristic can be included in the boundary conditions. The solution of the quadrupole wave equation is obtained by Fourier's method. It contains the dimensionless complex frequencies, whose real part represents the frequency of the oscillations and the imaginary part - the logarithmic decrement of attenuation characterizing the stability of the system. The stability was investigated for a system containing one outlet tube loaded with an arbitrary acoustical resistance. The phase-plane of the system was established, and from it the regions of static and dynamic stability as well as instability were determined. A similar investigation was carried out for a compressor with a single inlet tube, and also for a combination of both the inlet and outlet tu-

Card 2/3

33568
S/194/61/000/012/052/097
D256/D303

Self-oscillations of ...

bes present. It was found in particular that the resistance distributed in the tubes connected to the compressor increases the surplus stability of the compressor. There are 10 references. /Abstractor's note: Complete translation./

X

Card 3/3

S/103/60/021/04/04/007
B014/B014

AUTHOR: Kazakevich, V. V. (Moscow)

TITLE: Theory of the Ideal Model of an Extremal Controller

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol. 21, No. 4, pp. 489-505

TEXT: Automatic control systems frequently have to keep the quantity to be controlled at an extreme value or to prevent this quantity from exceeding a certain value. In the present paper, the author analyzes the mode of operation of an extremal controller using the methods of point transformation. The mode of operation is explained by means of the schematical representation shown in Fig. 1, after which the control processes are described. It is assumed that $p = f(v)$ for the quantity to be controlled. Here, v is a parameter. Then, a point v^* of v is defined, which is invariant with respect to a T-transformation. This point is calculated from the equation (B) $\delta = f(v^*) - f(v^* - \Delta v/2)$. The nature of the control process and the number of invariant points satisfying (B) are thoroughly studied in an extensive investigation. Among other things, it is shown that there is only one point on the ray $v < v^*$ that remains

Card 1/3

invariant in T-transformation, namely, v*. Furthermore, the positions of individual points v_1, v_2,... after the transformation are examined and, thus, the nature of the control process is disclosed. A study of the effect of changes in the parameters Δv and δ upon the nature of the control process shows that an increase of Δv has the same effect as a decrease of δ. Assuming that $p = -v^2$ (27) holds for the relation $p = f(v)$ the author studies a practical example. The possible motions of the system depend on the two parameters Δv and δ. The modes of control are graphically represented (Fig. 2) in the plane of the parameters Δv and δ. For $\Delta v = 3$ and $\delta = 1$ Fig. 3 shows a "phase diagram" of control to which range 1 corresponds in Fig. 2. The course of control in time is shown in Fig. 4 for the same case, for $\Delta v = 2$, and for $\delta = 1$. A comparison of the two curves indicates that the first case of control is less convenient than the second case, due to its longer control period and its higher control amplitude. It is finally shown that the accuracy of control is much more affected by a decrease of Δv than by an increase of δ. The article under review was first published in Trudy TsIAM in 1949, and the present copy is an exact reprint.

Card 2/3

Theory of the Ideal Model of an Extremal Controller

S/103/60/021/04/04/007
B014/B014

There are 6 figures and 2 Soviet references.

SUBMITTED: July 6, 1959

VC

Card 3/3

27639
S/194/61/000/002/028/039
D216/D302

16.8000(1013, 1068, 3001)

AUTHORS: Kazakevich, V.V, Kornilov, R.V. and Khristoforov, N.G.

TITLE: Electronic extremum controller

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 2, 1961, 39, abstract 2 V316 (V sb. Teoriya i primeneniye diskretn. avtomat. sistem, M., AN SSSR, 1960, 558-569)

TEXT: In an extremum controller operating with storage of the extremum, the fundamental disturbance is the fast monotonically disappearing extremum characteristic. For the stabilization of the position of the controlling device it becomes then advantageous to use a commutator which periodically reverses the speed of the machine. The presence of inertia or delay in the load influences the steady-state of a system with such a controller. If in a load without inertia in its steady-state positive and negative increments

Card 1/2

27639

S/194/61/000/002/028/039
D216/D302

Electronic extremum controller

alternate, then in the load with inertia after a few positive increments, the same number of negative increments will follow (the characteristic is said to be symmetrical). The bloc-diagram of extremum controller consists of a signum-relay determining the sign of the increment, a commutator and output device. The operation of the signum-relay and of the commutator are synchronized. The extremum controller has been tried on a model of the load. 7 references.

Card 2/2

82514

S/020/60/133/04/03/031
B019/B060

13.2000

AUTHOR: Kazakevich, V. V.

TITLE: On the Extreme Regulation of Inertial and Unstable Objects

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 756-759

TEXT: The author studied the system for the extreme regulation shown in Fig. 1, which consists of an inertial member, a nonlinear element, a device for the formation of signals, a signum relay, and a slave. This system exhibits an extremal dependence of the output signal of the inertial member on the input signal x of the nonlinear element; here, therefore, the inertia acts after the nonlinear element. The problem of extreme regulation consists in finding and maintaining y on the maximal value as a function $y = f(x)$. After pointing to the difference between the dynamic and the static value of the quantity y, caused by the inertial member, the author considers a procedure for the extreme regulation, by which it is possible to eliminate completely the influence of

Card 1/3

82514

On the Extreme Regulation of Inertial and Unstable Objects

S/020/60/133/04/03/031
B019/B060

inertia on the searching time, and by which it is possible to get rid of the unfavorable influence of low-frequency external disturbances. The differential equations (1) and (1') linking y to x are written down, and it is shown in a general study of these equations that the finding of the extreme is the more precise the larger the cross bar velocity. With the existence of an inertial object losses arise during the searching and so do larger oscillation amplitudes. A drawback exhibited by the method described here due to an insensitivity zone of the signum field is then discussed along with the ways of avoiding it. The positive aspects of the method are dealt with next. It is found in this connection that the system for extreme regulation, dealt with here, functions even with a very steep form of the extreme dependence and with very slow shifts of the extreme. Moreover, the approach to the extreme point is quick, and the influence of the external low-frequency disturbances is excluded. This method can be also used for the regulation of neutral and unstable systems. The extremal regulation of undamped oscillating objects and of unstable objects is finally dealt with, and the problem is discussed, as to how the searching time can be reduced, if an inertial member acts as far as the extreme element. A. P. Yurkevich is mentioned. There are

Card 2/3

S/020/60/133/005/002/019
B019/B054

AUTHOR: Kazakevich, V. V.

TITLE: On the Reduction of the Influence of Inertia in Extreme-value Control of Objects of the n-th Order

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 5, pp. 1041 - 1044

TEXT: It is assumed for this investigation that the regulator under review is working according to the "storage of maximum" principle, from which it follows that the reversion of the final control organ, i.e. the change of the sign of the velocity $\dot{x}$ at the input of the object, takes place after the dynamic quantity y of the object output, measured by a sensitive element, has passed through a maximum. In the case of an inert object, there is a difference between the dynamic curve y and the static curve y^*, and the scanning rate can be reduced by reducing this difference. Another possibility of reducing the inertia of the object is to find a method of establishing, within a finite time, the value $y_{\infty} = y^*$ which, in

Card 1/2

88399

S/020/61/136/004/005/026
B019/B056

16,9500 (1031,1121,1132)

AUTHORS: Kazakevich, V. V. and Yurkevich, A. P.

TITLE: Improvement of the Extremum Control of Inert Objects in the Presence of Disturbances

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 4, pp. 783 - 786

TEXT: In a previous paper (Ref.2), V. V. Kazakevich described a method for extremum control, which permits avoiding the action of the inertia of the object in the absence of dynamic terms in the object. In this system, a certain combination of signals is fed to the input according to the derivative of the quantity to be regulated. In the case of objects with low-frequency disturbances, this system offers special advantages, as the disturbances are filtered out. However, in the case of considerable disturbances, a considerably varying level of the extremum of the function, and, in the case of moderately fast cross beams of the final control organ, scanning may be considerably disturbed. The authors first confine themselves to control systems of first-order objects; the extremum element

Card 1/4

88399

Improvement of the Extremum Control of Inert Objects in the Presence of Disturbances

S/020/61/136/004/005/026
B019/B056

is characterized by the relation $y_1 = -K_x x^2$ (1) is assumed, where x and y_1 are the input and output coordinates of the extremum element. It is further assumed that $|\dot{x}| = V_x$ = const, and that between the inputs of the objects y_1 and y_2 the relation $y_2 = k_0 y_1/(p\tau_0 + 1)$ holds, where k_0 and τ_0 are constants. In the control method developed in Ref.2, the signal $z = K_D \dot{y}_2$ is fed to the input of the extremum regulator if nonlinear terms are not taken into account; in this case, the following relation holds with $y_1 K_D K_0/\tau = y$: $z = p\tau_0 y/(p\tau_0 + 1)$ (3). The symbols used here have been taken from Ref.2 and are not defined more closely. The transition processes in the system investigated here are described by a system of equations that is analogous to that describing the transition processes in an inertialess object with a dynamic input signal converter. Such systems have already been studied by A. P. Yurkevich (Refs. 3,4). Some results of these investigations are discussed, and, following this, it is assumed that the external disturbances are a linear function of time. (1) is then replaced by $y_1 = -K_x x^2 + K_1 t$ (4). As may be seen from a graphical

Card 2/4

88399

Improvement of the Extremum Control of Inert Objects in the Presence of Disturbances

S/020/61/136/004/005/026
B019/B056

representation of the control process, an oscillation with decreasing amplitude occurs near the extremum, the amplitude approaching a limit. Considerable disturbances are then briefly dealt with, which are a quadratic function of time. It is shown that in this case considerable deviations may occur, and it is noted that by a decrease of time, in the case of both linear and quadratic disturbances, the transition process may, in general, be shortened, and the amplitude may be decreased. It is then shown that by using a combined converter system for the input signal, the quality of extremum control is improved. The dynamic converter, in the case of an optimum time constant, suppresses the undesired influence of low-frequency disturbances, and the negative feedback of the insensitive range increases the accuracy of control near the extremum during the action of monotonic external disturbances. For the purpose of determining the parameters of the transition processes and of the limit cycles of the system, the construction of phase trajectories in multi-folium surfaces is of advantage. For an ideal case, in which instrument errors are excluded and the action of the inertia of the object may be neglected, the construction of phase trajectories is discussed in detail. There are 3 figures and 6 Soviet references.

Card 3/4

88399

Improvement of the Extremum Control of Inert Objects in the Presence of Disturbances

S/020/61/136/004/005/026
B019/B056

ASSOCIATION: Moskovskiy aviatsionnyy institut im. Sergo Ordzhonikidze (Moscow Aviation Institute imeni Sergo Ordzhonikidze)

PRESENTED: July 26, 1960, by N. N. Bogolyubov, Academician

SUBMITTED: July 12, 1960

Card 4/4

30560

S/569/61/002/000/006/008
D298/D302

13,2000
26,2195

AUTHOR: Kazakevich, V.V. (USSR)

TITLE: On extremum control of plants with lag and disturbances

SOURCE: IFAC, 1st Congress, Moscow 1960. Teoriya diskretnykh, optimal'nykh i samonastraivayushchikhsya sistem. Trudy, v. 2, 1961, 791 - 816

TEXT: Methods are considered for compensation of lag and of disturbances. First, a method is considered which would speed up the search process by 50 - 100 times. It is assumed that the extremum controller operates by the principle of storage of maximum. The oscillatory nature and inaccuracy of the process will be the smaller, the nearer the dynamical- and statical curves y and y*. This can be achieved by reducing the search time. This method however involves a large increase in settling time. Another way for lag compensation, is the following. It is necessary to find a method of search, in finite time, for the value $y_{\infty} = y^*$, which the actual

X

Card 1/11

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721230005-1"

system attains after an infinite time-lapse. This problem cannot be solved for every type of function f(x) if the input x is continuous as thereby the velocity of y is determined by the unknown function f[x(t)]. For step systems, the problem is solvable. A first-order object (plant) of type

$$T\dot{y} + y = f(x) \qquad (1)$$

is considered, where y is the output variable, x - the input variable and T - the time constant. The transient process in the step system is described by

$$T_1\dot{\bar{y}}_1 + \bar{y}_1 = f(x_1) - f(x_0) = a_1, \qquad (4)$$

where $\bar{y}_1 = y - y_0^*$. The solution of this equation is

$$\bar{y}_1 = a_1(1 - e^{-\frac{t}{T_1}}) \qquad (5)$$

X

or

$$y = y_0^* + [f(x_1) - f(x_0)](1 - e^{-\frac{t}{T_1}}). \qquad (5a)$$

If t approaches infinity, then e^{-t/T_1} approaches zero and $\bar{y}_\infty = a_1$, or

$$y_\infty(x_1) = y_1^* = y_0^* + [f(x_1) - f(x_0)] = y_0^* + a_1. \qquad (6)$$

By means of Eqs. (5) and (6), it is possible to determine (in a finite period) the value a_1 which the actual system attains after an infinite time. For this purpose it is necessary to set, after the input x has been given the increment Δ, two time-delays and to measure the values of $\bar{y}_1$ at the end of these intervals. Let the time delays be denoted by τ. A system of two equations with two unknowns is obtained, whose solution is

$$a_1 = \frac{\bar{y}_{11}^2}{2\bar{y}_{11} - \bar{y}_{12}}; \qquad (8a)$$

$$T_1 = -\frac{\tau}{\ln\left(\frac{\bar{y}_{12}}{\bar{y}_{11}} - 1\right)} . \tag{8b}$$

Thereupon, the input x is again displaced by Δ, and a_2 and T_2 are obtained. Two consecutive values of y_2^* and y_1^* are introduced into the signum-relay and the difference

$$\delta_1 = y_2^* - y_1^* = (y - \bar{y}_{12} + a_2)-(y_0^* + a_1) = \bar{y}_{12} + (a_2 - a_1)$$

is found. For the n-th cycle one obtains:

$$\delta_n = \bar{y}_{n2} + (a_{n+1} - a_n).$$

Hence it follows that it is not necessary to store and to add all the $\bar{y}_{i2}$ and a_i. If the controller has, in addition to a device which measures the output variable y, a tachometer for measuring the derivative $\dot{y}$, then a single time-delay only, is necessary. Assume the plant is linear and its time constant T_1 is known; in this case a_1 can be found if a pair of values $\bar{y}_{11}$ and $t_1 = \tau$ are known which satisfy Eq. (5). As before, the difference δ_n is obtained after n cyices:

$$\delta_n = y^*_{n+1} - y^*_n = k\bar{y}_{n+1} - (k - 1)\bar{y}_{n1}.$$

The above argument can be extended to a plant which is described by an n-th order system of differential equations with constant coefficients:

$$y^{(n)} + b_1 y_1^{(n-1)} + \dots + b_n y = 0. \qquad (17)$$

It is assumed that the properties of the plant are known, hence all the roots λ of the characteristic equation are known. The solution of the equation which describes the transient process is

$$\bar{y}_1 = \frac{a_1}{b_n} + \sum_{k=1}^{n} A_{k1} e^{-\lambda_k t}. \qquad (22)$$

For $t = \infty$,

$$\bar{y}_{1\infty} = \frac{a_1}{b_n}. \tag{24}$$

The quantity $\bar{y}_{1\infty}$ is determined by the same method as before, i.e. $\bar{y}$ is measured at the end of several time-delays (intervals). As a result one obtains a system of (n+1) equations in (n+1) unknowns. Calculating the quantity a_1/b_n by means of a computer, the steady-state value of y_1^* is found. Then y_2^* is determined, and δ_1:

$$\delta_1 = y_2^* - y_1^* = (y_0 + \bar{y}_{1,n+1} + \frac{a_2}{b_n}) - (y_0 + \frac{a_1}{b_n}).$$

The measuring process continuous as above. In the case of one measuring device, (n+1) time-delays are necessary. With increasing number of measuring devices, the number of time-delays decreases correspondingly. Thus, if measuring devices for the output variable and for the first (n-1) derivatives are used, only a single time-delay is necessary. If the process is aperiodic and the roots λ are unknown, the number of unknown variables increases to 2n+1. In this case 2 time delays are necessary if the output and the (n--1) derivatives are measured. If the velocity of the external disturbances can be considered as constant over the total time-delays then it is possible to compensate the disturbances by increasing the number of delays τ by one. Two cases are considered: 1) A first-order plant with lag, and 2) Without lag. In the first case, a system of 3 equations with the 3 unknowns y_i^*, b_i and T_i is obtained (b_i denotes the constant velocity of the disturbance and T_i - the lag). Depending on the sign of

$$\delta = y_{i+1}^* - (y_i^* + 3\tau b_i),$$

the signum-relay changes the direction of the input. Then the next step of the search process starts (with y_{i+2}^*), etc. Further, the character of the transient processes at each of the stages is considered. In case of a plant without lag (T = 0), only 2 equations are required. A plant with nonlinear dynamical elements is described by

$$\varphi_1(y', y'', \ldots, y^{(n)}) + \varphi_2(y) = f[x(t)] \qquad (31)$$

where $\varphi_1 = y^{(n)} + \varphi_{11}(y', y'', \ldots, y^{(n-1)})$.

Eq. (31) is written in the form

$$\varphi_1(y', y'', \ldots, y^{(n)}) = f(x) - \varphi_2(y). \qquad (33)$$

It is necessary to find the static ("potential") maximum of y. This can be attained if the right-hand side of Eq. (31) is a maximum. From Eq. (33) it is evident that with $\varphi_2(y)$ = const., the maximum of f(x) will correspond to the maximum of φ_1. Thus, by introducing the function φ_1 in the extremum controller and by searching for its maximum at sufficient speed of the controller, this maximum will be attained for a value of $x \approx x^*$ which maximizes the function f(x); with such a value of x*, the variable y assumes maximum value too, (after the transient processes in the lag element have ceased). This result is valid if y = const., which is the case with inifnite speed of search. In practice however, this speed is limited; nevertheless, if the speed is sufficiently high, the search for φ_{1max} approximates the search for $f(x)_{max}$. Thereby the low-frequency disturbances do not affect the search process. It is noted that, unlike ordinary extremum-systems, the extremum-search under consideration will the more accurate, the higher the speed of computation. The above method of extremum control has the following advantages: 1) The control system will operate even if the form of the extremum functional-dependence is very smooth. 2) The extremum point is approached with maximum speed and little hunting; low frequency disturbances are compensated. 3) The method is also applicable to neutral- and unstable systems, and to systems with modulated input. Further, a variant of the method is considered, which yields a solution to the problem, with any speed of computation. Hitherto, it was assumed that the lag element follows the extremum controller; if there is also a lag element preceding the controller, the search process can be speeded up by changing the position of the controller. It is noted that the step-wise method

30560

On extremum control of plants ... S/569/61/002/000/006/008
D298/D302

(of the first section of the report) is more advantageous whenever the time constants of the plant have to be determined during the process which is the case with systems of order higher than the first. In the case of white noise or high-frequency noise components, the likelihood that signal and noise will coincide, can be reduced by alternating the frequency of the signal. In the case of a plant with lag, random noises and constant disturbances, the hunting can be reduced by a combination of the above methods. A figure shows the block-diagram of a setup which operates by the combined method. This setup incorporates a "guarding" device which stops the search if the extremum is attained and renews it if the controlled variable deviates from the extremum by a given value. A discussion followed. Taking part were: A.P. Yurkevich, V.P. Putsillo, Yu.I. Ostrovskiy, A.A. Pervozvanskiy, I.S. Ukolov (USSR). There are 7 figures and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: S. Serdengecti, Optimalizing control in the presence of noise interference. Jet. propulsion, v. 26, no. 6, 1956; G. Vasu, Experiments with optimalizing controls applied to rapid

Card 10/11

30560

S/569/61/002/000/006/008

On extremum control of plants ... D298/D302

control of engine pressure with high-amplitude noise signals. Trans. ASME, v. 79, no. 3, 1957

Card 11/11

41277
S/588/62/000/005/004/004
I011/I242

24.4100

AUTHOR: Kazakevich, V.V.

TITLE: The approximate investigation of some types of strongly non-linear autonomous systems

SOURCE: Avtomaticheskoye upravleniye i vychislitel'naya tekhnika. no. 5. Moscow, 1962, 365-442

TEXT: A second-order system described by

$$\ddot{x} + k^2x + \mu f_1(x,\dot{x}) = 0 \qquad (1)$$

is investigated. The method proposed here is independent of the magnitude of μ and yields very good results when investigating non-linear conservative systems if the elastic force increases monotonically with the deviation while its x derivative decreases monotonically. The method can be applied to many non-conservative systems, especially when the oscillation period is determined. It is possible to establish how nearly a given system approaches any linear system. The shortcomings of Van der Pol's method are pointed out;

Card 1/3

S/588/62/000/005/004/004
I011/I242

since the method is based on averaging over a period, it cannot bring out the effect of friction forces in dissipative systems which are symmetric about the origin. This brings forth the idea of breaking up the given system, in which the character of cooperation between the friction and the elastic forces changes several times in a given period, into as many "quasi-conservative" systems. The character of this cooperation will be constant in each of these systems and will equal that in the corresponding part of the cycle in the original system. The solution of each system coincides with the solution of the given system in the corresponding part of the cycle. Some possible cases are investigated: (a) symmetry of the phase diagram about both coordinate axes; (b) no symmetry of the integral curves about the coordinate axes; (c) dissipative systems; (d) self-oscillating systems; (e) symmetry about the abscissa; (f) symmetry about the ordinate; (g) non-symmetric system.
A method of finding the form of oscillations is given. Its use is illustrated in an example. A method for an approximate integration

S/588/62/000/005/004/004
I011/I242

The approximate investigation of...

of systems with one degree of freedom is proposed an applied. Results are compared with those of other methods. The deviation of the results from those of the small-parameter methods is a measure of the amount by which the given system approaches a linear one. The method described here is applied to higher-order systems. There are 23 figures and 3 tables. The most important English-language reference is: B. Van der Pol, Radio Review, 1, p.701, 1920, Phylos. mag. 7,2, p. 978, 1926.

Card 3/3

KAZAKEVICH, V.V.

Approximate study of some types of strongly nonlinear autonomous systems. Avtom. upr. i vych. tekh. no.5:365-442 '62. (MIRA 15:9)

(Automatic control)

KAZAKEVICH, V.V., prof., doktor tekhn. nauk; PASHKOVA, V.N., red.

[redacted]

[Automatic control of technological operations] Avtomaticheskoe regulirovanie tekhnologicheskikh protsessov; uchebnoe posobie po kursu "Avtomaticheskoe upravlenie i regulirovanie tekhnologicheskikh protsessov v poligrafii." Moskva, Mosk. poligr. in-t, 1963. 65 p. (MIRA 16:9)

(Automatic control)

(Printing machinery and supplies)

KAZAKEVICH, V.V. (Moskva); OSTROVSKIY, G.M. (Moskva)

Problem concerning indirect control taking into account coulomb friction in the sensitive element. Avtom. i telem. 24 no.8:1141-1144 Ag '63. (MIRA 16:8)

(Automatic control)

KAZAKEVICH, V.V.

Optimalizing control. Avtom. upr. i vych. tekh. no.6:[illegible] '64.
(MIRA 17:[illegible])

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721230005-1"

LIBERZON, Leonid Mikhaylovich; RODOV, Aleksandr Borisovich; KAZAKEVICH, V.V., prof., red.; POPKOV, Yu.S., red.

[Optimalizing control systems] Sistemy ekstremal'nogo regulirovaniia. Pod red. V.V.Kazakevicha. Moskva, Energiia, 1965. 158 p. (Biblioteka po avtomatike, no.154) (MIRA 19:1)

L 8344-66 EEC(k)-2/EWA(h)/EWP(k)/EWT(d)/EWT(l)/EWP(v)/EWP(l)/EWP(h)

ACC NR: AP5025750 SOURCE CODE: UR/0286/65/000/018/0097/0098

AUTHORS: Gol'dinov, M. Ya.; Kazakevich, V. V.

B

ORG: none

TITLE: Fast acting pneumatic regulator. Class 42, No. 174066

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 18, 1965, 97-98

TOPIC TAGS: pneumatic regulator, automatic control, PNEUMATIC CONTROL, PNEUMATIC CONTROL SYSTEM

ABSTRACT: This Author Certificate presents a fast acting pneumatic regulator based on USEPPA elements containing a first derivative transducer, a signum-relay, a checking reverser commutator, a reverse trigger, and an actuating mechanism. To increase the regulator stability margin during drifting of an extreme characteristic, the signum-relay output is simultaneously connected to the inlet of a blocking relay and through a discrete memory element to the inlet of an intermediate relay. The latter is connected to the blocking relay, and its outlet is connected to the reverser trigger.

SUB CODE: 13/ SUBM DATE: 29Apr64

jw

Card 1/1

UDC: 621-525-55

SUB CODE: 17/ SUBM DATE: 04May60

UDC: 621.3.078

Card 1/1

L 09269-67 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(l)
ACC NR: AP6029887 (A) SOURCE CODE: UR/0413/66/000/015/0049/0049
32

INVENTOR: Kazakevich, V. V.

ORG: none

TITLE: Method for extremal control of objects whose motion is described by an n-th order differential equation. Class 21, No. 184317

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 49

TOPIC TAGS: optimal control, control circuit

14

ABSTRACT: This Author Certificate presents a method for extremal control of objects whose motion is described by an n-th order differential equation. To simplify location of the optimum with fast continuous variation of the controlling parameter, the moment of passage through a zero of the n+1-st derivative of the output parameter is recorded and the direction of motion of the controlling parameter is varied with the variation of sign of this derivative (see Fig. 1).

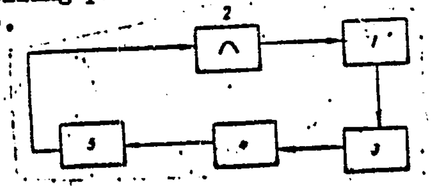

Fig. 1. 1 - dynamic element; 2 - nonlinear (extremal) element; 3 - differentiating device; 4 - trigger; 5 - control element

Orig. art. has: 1 diagram.

UDC: 621.3.078

Card 1/1 SUB CODE: 12, 09/ SUBM DATE: 04May60

extremum characteristics and make it possible to determine the extremum value of the input in the minimum time and with the smallest "yawing" of the input coordinate. The derived algorithm for eliminating the inertial effect

Card 1/2 UDC: 62-50

ACC NR: AP7002091

is extended to pure delay systems. For this purpose, a first-order system is taken with the assumption that the value of the time constant is known. The derived algorithm for searching the extremum takes into account the increment of the input at every step and makes it possible to determine and to take into account the harmful effect of the delay. Orig. art. has: 4 figures and 21 formulas.

SUB CODE: 09/ SUBM DATE: 04Jan66/ ORIG REF: 007/ ATD PRESS: 5112

Card 2/2

#212

KATSOBASHVILI, V.Ya

TO

KAZAKEVICH, V.V.

END