L 06268-67

ACC NR: AP6028542 SOURCE CODE: UR/0280/66/000/003/0126/0134

43
B

AUTHOR: Volkovich, V. L. (Kiev); Samoylenko, Yu. I. (Kiev)

ORG: none

TITLE: Optimal detection of signals by a spatially distributed reception system

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 3, 1966, 126-134

TOPIC TAGS: signal detection, antenna array, random noise, radio reception

ABSTRACT: An approach, based on the general theory of detection, to the problem of the synthesis of equipment for the space-time detection of signals is presented. A solution is found for the problem of synthesizing an optimum distributed (diversity) signal detection system, designed to operate against the background of a random interference field. The general correlations obtained in the paper may be used when analyzing the quality of detection of signals of finite length by two-point receiving equipment with an infinite time base. Using this type of detection system and a four-dimensional space-time continuum (the direct product of infinite three-dimensional space and an infinite time interval), the authors show that the method of space-time signal selection makes possible a substantial improvement in the quality of signal detection. This finding is in agreement with previously published results (V. D. Volkovich, Yu. I. Samoylenko. Sb. "Slozhnyye sistemy upravleniya", "Naukova

Card 1/2

L 06268-67

ACC NR: AP6028542

Dumka", ser. "Kibernetika", 1965) regarding the problem of signal filtering based on a criterion of the least mean-square error. Orig. art. has: 50 formulas.

SUB CODE: 09,17/ SUBM DATE: 29Sep65/ ORIG REF: 010/ OTH REF: 001

Card 2/2

L 27778-66 EWT(d)
ACC NR: AP6007155 SOURCE CODE: UR/0108/66/021/002/0070/0073 33 B

AUTHOR: Samoylenko, Yu. I. (Active member); Zyuzin-Zinchenko, A. A. (Active member)

ORG: Scientific and Technical Society of Radio Engineering and Electrocommunication (Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi)

TITLE: Principle of distributed reception of information

SOURCE: Radiotekhnika, v. 21, no. 2, 1966, 70-73

TOPIC TAGS: radio reception, signal reception, signal noise separation

ABSTRACT: A receiving system is considered in which the information about the transmitted signal is derived from the field values measured in a delimited space. Noise sources are distributed along the transmitter-receiver line; no noise source is assumed in the delimited space; conventional frequency filtration of signals is assumed in the receiver. An integral equation of the received signal (with a limited dispersion of noise field intensity) is set up and transformed into a first-kind Fredholm-type equation having a Cauchy kernel. By constructing a sequence of linear functionals with a continuous weight function, it is proven that the distributed reception system ensures an almost regular channel of communication. The near-regularity characteristic is inherent to a wide class of distributed channels with additive noise which can be described by an operator with a nondegenerate kernel. Orig. art. has: 17 formulas.

SUB CODE: 17, 09 / SUBM DATE: 20Jun63/ ORIG REF: 003 / OTH REF: 001
UDC: 621.391.13

Card 1/1 ce

KOROB'O, M. I.; SA'OYLENKO, Yu. I.

" Dynamic Planning of an Open Hearth Plant. "

Paper to be presented at the IFAC Congress to be held in Basel, Switzerland, 27 Aug to 4 Sep 63

BACHURIN, S.D.; SAMOYLENKO, Yu.N.

Results of introducing radiometric sampling in the antimony mine of the Frunze Southern Mining and Metallurgical Combine. Uch. zap. SAIGIMSa no.8:47-52 '62. (MIRA 17:1)

1. Yuzhnyy gornometallurgicheskiy kombinat im. Frunze.

Samoylenko, Yu. P.

AID P - 2127

Subject : USSR/Engineering

Card 1/1 Pub. 35 - 16/20

Author : (Letters from readers) Samoylenko, Yu. P.

Title : On the discharge ratio of a broad-sill spillway

Periodical: Gidr. stroi., no.3, 44-45, 1955

Abstract : The author mentions several names of scientists who have worked on the problem and demonstrates, with equations, that the discharge ratio depends upon the height of the sill and the shape of the inlet. One diagram. Six Russian references, 1934-1953.

Institution: None

Submitted : No date

SAMOYLENKO, Z.I.

The chemical-mineralogical composition of clayey soil of Omsk deposits and its effect on the properties of keramzit. [illegible]-uch.zav.; stroi. i arkhit. 5 no.4:99-104 '62. (MIRA 15:9)

1. Sibirskiy avtomobil'no-dorozhnyy institut imeni Kuybysheva.
(Omsk Province—Clay) (Keramzit)

SAMOYLIK, S.S.

Coal mining by means of the A-2 planer unit without the presence of miners. Ugol'.prom. no.1:26-28 Ja-F '62. (MIRA 15:8)

1. Glavnyy inzh. proyektov "Luganskproyekt".
(Donets Basin—Coal mines and mining) (Coal mining machinery)

SAMOYLIK, V.

Outstanding automobile driver. Avtotrakt. 39 no.10:10 '58. (MIRA 14:10)

1. Avtomobil'nyy gekretar' redaktsii gazety "Avtodorozhnik [illegible]".
(Automobile drivers)

SAMOYLIKOV, K. (Noginsk Moskovskoy obl.); FILATOV, K. (Borovichi Novgorodskoy obl.); MAL'TSEV, V. (Minsk); SAMODUROV, D. (Leningrad); BOYKOV, K. (Kuybyshev); SMITSKIY, V. (Leningrad)

Our New Year interviews. Radio no.1:10-11 Ja '63. (MIRA 16:1)
(Radio)

SAMOYLIKOV, K., radiolyubitel'

Black-and-white in color. IUn.tekh. 7 no.3:48 Mr '63. (MIRA 16:3)

(Television—Equipment and supplies)
(Light filters)

SAMOYLIKOV, K., inzh.

Multirange instrument for tuning television receivers. Radio no.7: 46-48, 53 Jl '63. (MIRA 16:7)

(Television—Maintenance and repair)

SAMOYLIKOV, K.

PA 51/49T102

USSR/Radio Jul 49
Vacuum Tubes, Miniature
Radio Receivers

"New Constructions for Rural Radiofication," K. Samoylikov, Dir, Radio Club, 14th Noginsk School, 1 p

"Radio" No 7

Author is now working out design of an economical radio receiver using miniature tubes. He is also working on an adapter which will permit "Rodina" and "Elektrosignal" battery receivers to be used from an AC supply without replacing any tubes.

51/49T102

SAMOYLIKOV, K.

PA 239T57

USSR/Electronics - Vacuum Tubes Jan 52
Instruments

"An Instrument for Testing Vacuum," K. Samoylikov

"Radio" No 1, pp 45-47

The instrument consists of a buzzer, a variable resistor, a capacitor, and a step-up transformer. Hf oscillations are set up by an arc between buzzer contacts; these are stepped up by the transformer and potentials as high as 30,000 v can be obtained at the probe, which is held close to the tube being tested. The elec field set up

239T57

by this potential causes ionization of the gas in the tube; if the vacuum is insufficient, glow of the gas in the tube will be observed.

239T57

SAMOYLIKOV, K.

Television - Receivers and Reception

Struggle with interference in television reception. Radio no. 2, 1952.

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

Samoylikov, K

AUTHOR: Samoylikov, K., Noginsk 107-8-58/62

TITLE: Experience Exchange. Coil Forms (Obmen opytom. Karkasy dlya katushek)

PERIODICAL: Radio, 1957, p. 63 (USSR)

ABSTRACT: Tubular ceramic bodies of KBGI condensers can be used as forms for high frequency coils. For that purpose it is necessary to unsolder both metal sidepieces from the ceramic body, remove all content from the tube and clean it thoroughly. Then the sidepieces should be remounted on the body with one end of the winding wire fastened to one of them. After winding the required number of turns the other end of the wire should be affixed to the second sidepiece. The coil is then glued to the ceramic body. Inductance adjustment of the coil is achieved by unwinding the superfluous turns.

AVAILABLE: Library of Congress

Card 1/1

SAMOYLIKOV, K.

Rectifier for the power supply of television receivers. Radio no.2:35, 38 F '61. (MIRA 14:9)
(Electric power supply to apparatus)
(Television--Receivers and reception)

SAMOYLIKOV, K.

Device for testing television receivers. Radio no.6: 27-28 Je '64. (MIRA 17:10)

SAMOYLIKOV, V.K., inzh.

Use of metal broaches for cleaning boilers. Energetik 9 no.8:5-6 Ag '61. (MIRA 14:8)
(Boilers)

SAMOYLIN, A.M.

136-8-12/21

AUTHORS: Gusarov, V.I. and Samoylin, A.M.

TITLE: Measurement and Automatic Regulation of Levels of Water, Solutions and Pulps in Open Tanks (Izmereniye i avtomaticheskoye regulirovaniye urovney vody, rastvorov i pul'p v otkrytykh bakakh)

PERIODICAL: Tsvetnye Metally, 1957, Nr 8, pp.63-67 (USSR)

ABSTRACT: The authors describe some of the equipment used at the Ural Aluminium Works (Ural'skiy Alyuminiyevyy Zavod) for measuring and automatically controlling liquid and pulp levels in open tanks. The arrangements described include a piezometric level-indicator with a closed and an open transducer, a resistance-type water level indicator, a differential-manometer type of level indicator and schemes for automatic starting of pumps and for automatic pump control. An editorial note points out that better methods than those described are available but cannot be widely adopted because of equipment shortages: the proposed methods are commended for adoption by works wishing to introduce automatic methods without waiting for new equipment. There

Card 1/2

SOV/136-58-6-4/21

AUTHORS: Gusarov, V.I. and Samoylin, A.M.

TITLE: Integrated Automation of a Bauxite Wet Grinding Department (Kompleksnaya avtomatizatsiya otdeleniya mokrogo razmola boksita)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 6, pp 26 - 30 (USSR)

ABSTRACT: At the Ural Aluminium Works, the crushing of bauxite for producing alumina by the Bayer method is done in jaw and cone crushers and fine grinding in wet ball mills. A group at the works proposed the automation of the wet-grinding department (Figure 1). Here, the crushed bauxite has up to 5% lime added, the mixture being discharged from the bunker by a plate feeder and conveyed to the ball mill to which return solution and fresh alkali are added. The pulp goes to a classifier, where return solution is added and then to a hydrocyclone. The pulp from the hydrocyclone goes via mixer tanks to the leaching sector. The objects of the automation work were to concentrate control of the main equipment at the central control point and to make the operation of the main units automatic under conditions set centrally by the controller. The following operations have been automated. The addition of return solution by local float-and-valve devices (Figure 2) and

Card1/3

also the distribution of the solution between mills and classifiers and solution feed from the collector tank to the distributing device (Figure 3). Bauxite feed to the ball mills with the aid of a belt weigher on the feed conveyor whose signal regulates the plate feeder via a suitable control system (Figure 4).
The switching of the Sands stream from one mill to another (Figure 5) to a programme, if required. Fresh-alkali feed, which is effected in the same way as for return-solution feed. After describing the automation of the above operations, the authors outline the instrumentation and the system of interlinking and overall process control in the wet-grinding department. An alarm system indicates the failure of a unit. The switching on and off of the bauxite-bunker vibrators is to be automatic. The standard electromechanical regulator made by the "Il'marine" Works and modified for operation at a higher pressure is used. All the equipment has been in

successful use for several months and the adoption of automation has improved the operation of the department and allowed the shift personnel to be reduced by 50%. There are 5 figures.

ASSOCIATION: Ural'skiy alyuminiyevyy zavod (Ural Aluminium Works)

GUSAROV, V.I.; SAMOYLIN, A.M.; BURGARDT, A.A.

Complete automatization of aluminum hydroxide calcination processes in rotary kilns. TSvet.met. 34 no.9:64-70 S '61. (MIRA 14:10)

(Aluminum—Metallurgy) (Automatic control)

GUSAROV, V.I.; SAMOYLIN, A.M.; BURGARDT, A.A.

Automatic control of the process of continuous leaching of bauxite. TSvet. met. 35 no.4:49-56 Ap '62. (MIRA 15:4)
(Bauxite) (Leaching) (Automatic control)

SAMOYLIN, V.A., inzh.

Testing the E-4010 excavator-planer. Stroi. i dor. mash. 10 no.7:9 Jl '65. (MIRA 18:8)

BAGDASAROV, A.A., prof.; CHERTKOV, I.L.; RAUSHENBAKH, M.O., prof.; SAMOYLINA, N.L.; SHEREMET, Z.I.

Properdin system in acute radiation sickness. Med. rad. 4 no.4: 3-10 Ap '59. (MIRA 12:7)

1. Iz TSentral'nogo ordena Lenina instituta gematologii i perelivaniya krovi. 2. Deystvitel'nyy chlen AMN SSSR (for Bagdasarov).

(PROPERDIN,
in radiation sickness in animals (Rus))
(ROENTGEN RAYS, eff.
acute radiation sickness on properdin system in animals (Rus))

CHERTKOV, I.L.; SAMOYLINA, N.L.

Simplified methods of obtaining zymosan and the titration of properdin. Probl. gemat. i perel. krovi 4 no.6:53-57 Je '59.
(MIRA 12:8)

1. Iz Tsentral'nogo ordena Lenina instituta gematologii i pereliv-aniya krovi (dir. - deystvitel'nyy chlen AMN SSSR prof. A.A. Bagdasarov) Ministerstva zdravookhraneniya SSSR.
(PROPERDIN, determ.
titration method using zimozan (Rus))

BAGDASAROV, A.A.; RAUSHENBAKH, M.O.; SUKYASYAN, G.V.; ABDULLAYEV, G.M.; NOVIKOVA, M.N.; LAGUTINA, N.Ya.; SAMOYLINA, N.L.; CHERNOV, G.A.

Some aspects of the clinical course and treatment of acute radiation sickness in monkeys. Med.rad. 4 no.9:17-24 S '59. (MIRA 12:11)

1. Iz TSentral'nogo ordena Lenina instituta gematologii i perelivaniya krovi Ministerstva zdravookhraneniya SSSR.
(RADIATION INJURY exper)

SAMOYLINA, N.L.

Distribution of C^{14}-labelled zymosan in the tissues of mice on intravenous administration. Probl.gemat.i perel.krovi no.7: 16-21 '62. (MIRA 15:9)

1. Iz TSentral'nogo ordena Lenina instituta gematologii i perelivaniya krovi (dir. - dotsent A.Ye. Kiselev) Ministerstva zdravookhraneniya SSSR.
(ZYMOSAN) (CARBON—ISOTOPES)

SAMOYLO, A.I.; POPOVA, N.N., red.

[Industrial buildings of precast elements] Proizvodstvennye zdaniia iz sbornykh elementov. Moskva, Vysshaia shkola, 1965. 215 p. (MIRA 18:3)

SAMOYLO, K. A.

"Computation of a Pulse Cathode Follower," pp 79-88, ill, 2 ref

Abst: A simple method of cathode followers calculation, taking into account the shunting capacitance, for transmission of pulses without distortion -- i.e., for operation without cutoff of plate current and without appearance of grid current -- is presented

SOURCE: Trudy Moskovskogo Energeticheskogo In-ta im. V. M. Molotova (Works of the Moscow Energetics Institute imeni V. M. Molotov), No 21 -- Radio Engineering, Moscow-Leningrad, Gosenergoizdat, 1956

Sum 1854

SOV/112-57-5-10522

.8 (2)

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1957, Nr 5, p 142 (USSR)

AUTHOR: Samoylo, K. A., Talanina, N. V., Meshchankina, A. Ye., Bogachev, I. D.

TITLE: Method for Precision Measurement of Phase Difference (Metod tochnogo izmereniya raznosti faz)

PERIODICAL: Tr. Mosk. energ. in-ta, 1956, Nr 21, pp 89-99

ABSTRACT: Methods of precision measurement of phase difference, which are based on the multiplication of frequency of the process in question, are considered. It is pointed out that the accuracy of measuring the phase-shift angle increases n times, where n is the frequency multiplication factor. A number of such schemes are considered; a scheme with a two-channel frequency multiplication, a scheme with a switch and an auxiliary frequency multiplication channel, and a scheme with a switch but without the auxiliary multiplication channel. Two latter methods use an electron-beam tube as an

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SAMOYLO, K.A., kand. tekhn. nauk, dots.

Frequency divider with direct locking. Trudy MEI no.31:14-29 '56
(Pulse techniques(Electronics)) (MIRA 13:3)
(Frequency changers)

SAMOYLO, K.A., kand. tekhn. nauk, dots.

Phase skipping caused by the action of pulsed interferences when frequency is divided. Trudy MEI no.31:30-43 '56 (MIRA 13:3)
(Pulse techniques electronics)
(Frequency changers)

SAMOYLO, K.A., kand. tekhn. nauk, dots.

Investigation of parasitic phase modulation of the output voltage of an amplifier and locked oscillator in the presence of simusoidal interference. Trudy MEI no.31:44-54 '56 (MIRA 13:3)
(Phase modulation) (Amplifiers (Electronics)
(Oscillators, Electric)

SAMOYLO, K.A., kand. tekhn. nauk, dots.; TAIANINA, N.V., inzh.

Additional error in the measurement of phase difference which arises in frequency multipliers. Trudy MEI no.31:55-68 '56 (MIRA 13:3)
(Frequency multipliers)

SAMOYLO, K.A.; TALANINA, N.V.

Determining the instantaneous value of the resistance phase of a coil in a parallel oscillator circuit by the phase-plane method. Izv. vys. ucheb. zav.; radiotekh. no.3:362-372 My-Je '58. (MIRA 11:7)

1.Rekomendovana kafedroy osnov radiotekhniki Moskovskoge energeticheskogo instituta.
(Radio circuits)

67208

9.3260 SOV/58-59-7-16089

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 7, p 206 (USSR)

AUTHOR: Samoylo, K.A.

TITLE: Direct Lock-In Frequency Divider

PERIODICAL: Tr. Mosk. energ. in-ta, 1958, Nr 31, pp 14 - 29

ABSTRACT: This article is a theoretical study of dividing frequency by means of a self-oscillator locked in with harmonics. The analysis is conducted by the so-called phase-pulse method, which consists in studying the phase plane of changes in the voltage in the oscillating circuit of an oscillator in the presence of current pulses. The author discusses the diagram of an ordinary LC oscillator connected in the anode circuit. It is assumed that in addition to the voltage induced by the circuit $U_g = U_0 \cos \omega_0 t$, an external emf $e = e_0 \cos [\omega t + \varphi]$ (where $\omega \approx n\omega_0$) also acts on the grid of the tube. In order to simplify the analysis, the sinusoidal external emf is replaced by the corresponding sequence of pulses with the amplitude e_0. The author sets up a differential equation describing the phase change and calculates the conditions of steady-state division. He examines the factors influencing the division bandwidth

Card 1/2

Direct Lock-In Frequency Divider

67208
SOV/58-59-7-16089

(the maximum frequency difference of the external emf at which division is maintained). It is shown that in order to widen the division band, it is necessary to reduce the coefficient of division, increase the transconductance of the characteristics of the plate current of the oscillator tube, and increase the characteristic impedance of the circuit, as well as the magnitude of the feedback coefficient. The author discusses the effect that the amplitude and waveform of the lock-in emf, have on the magnitude of the division band.

S.A.

Card 2/2

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A052/A001

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Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 12, p. 236, # 25540

AUTHOR: Samoylo, K.A.

TITLE: Phase Jumps Caused by Impulse Noises at Frequency Division

PERIODICAL: Tr. Moskov. energ. in-ta, 1958, No. 31, pp. 30-43

TEXT: Phase jumps are considered which arise under influence of impulse noises in relaxation frequency dividers, direct capture dividers and regenerative frequency dividers. The analysis is carried out in the phase plane. It is shown that direct capture dividers have the maximum phase noise stability when exposed to impulse noises.

K.A.S.

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

Card 1/1

S/112/59/000/012/080/097
A052/A001

16.9500

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 12, p. 236, # 25539

AUTHORS: Samoylo, K.A., Talanina, N.V.

TITLE: An Additional Error in Measuring Phase Difference Arising in Frequency Multipliers

PERIODICAL: Tr. Moskov. energ. in-ta, 1958, No. 31, pp. 55-68

TEXT: The error of measuring phase difference is considered which arises in frequency multipliers due to their inaccurate tuning. The analysis is carried out in the phase plane for the case of a small cut-off angle of anode current. The law of the error accumulation in a chain of multipliers is considered. Phase meter circuits are geven which make possible to carry over a given error in the spread of indications (a systematic error into a random error). It is shown that the least error takes place when a chain of push-pull frequency doublers is used.

K.A.S.

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

Card 1/1

SOV/109-4-1-7/30

AUTHORS: Fedosova, T.S. and Samoylo, K.A.

TITLE: Frequency Divider with a Direct Lock-in (Delitel' chastoty s neposredstvennym zakhvatyvaniyem)

PERIODICAL: Radiotekhnika i Elektronika, 1959, Vol 4, Nr 1, pp 43 - 53 (USSR)

ABSTRACT: The division of frequency is normally done by means of relaxation dividers, LC-type dividers or by means of combined circuits. The article deals with the theory of an LC-type divider and that of a combined divider. The diagram of a simple LC divider is shown in Figure 1; this consists of a resonant circuit and a feed-back circuit and comprises a source of the synchronising voltage. The amplitude and phase of the system are governed by the following simplified equations:

$$2\frac{dU_m}{d\tau} = \rho J_0\alpha - \frac{U_m}{Q} \qquad (9)$$

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Frequency Divider with a Direct Lock-in

$$2\frac{d\varphi}{d\tau} = -\nu - \frac{Q}{U_m} J_0\beta \qquad (10)$$

where $\tau = \omega_0 t$. In these equations $J_0\alpha$ and $J_0\beta$ are defined by Eqs (3) in which i_a denotes the amplitude of the anode-pulse current; Q denotes the quality factor of the resonant circuit, while ν is defined by Eq (6) in which ω_H is the nominal frequency of the system; ω_H is n times smaller than the frequency of the external electromotive force. The steady-state amplitude U_{mo} and the steady-state phase φ_{CT} are defined by Eqs (12) and (13). These equations can be used to analyse the LC divider shown in Figure 5. In this, the righthand-side tube converts a sinusoidal voltage into rectangular phase-inverted pulses which are fed to the grid of the lefthand-side tube. The external synchronising signal is in the form of a train of

Frequency Divider with a Direct Lock-in

rectangular pulses; this is also fed to the grid of the lefthand-side tube. Consequently, the tube is conducting when both the voltages at the grid are equal to zero and it is closed when one of the voltages is negative. The envelope of the anode current pulses can be expressed by Eq (17), where i_m is expressed by Eq (18), where R_i is the internal resistance of the lefthand-side tube. The parameters $J_c\alpha$ and $J_c\beta$ can, therefore, be written in the form of Eqs (19) and (20). The steady-state amplitude U_{mo} and steady-state phase shift φ_{CT} can be written as Eqs (28) and (29). The synchronisation bandwidth of the divider is defined by Eq (31) in which ψ_{make} is given by Eq (27). The following notation is adopted in Eq (27): τ_o is the length of the synchronising pulse expressed as a fraction of the oscillation period, T_p is the length of the pulse produced by the righthand-side tube (expressed as a fraction of the oscillation period) and T_{OFT} is defined by Eq (25). When the internal

Frequency Divider with a Direct Lock-in

resistance of the tube is infinite, the amplitude and the phase are expressed by Eqs (33) and (34), respectively. If the synchronising pulses are in the form of a sinusoidal signal, the parameters $J_c\alpha$ and $J_o\beta$ are expressed by Eqs (38) and (39), respectively; in this case, it is found that the synchronisation bandwidth is about 30% lower than in the presence of rectangular synchronising pulses. Large synchronising bandwidths can be obtained if a combined divider consisting of a relaxation oscillator and an LC circuit is used. Block schematic of such a divider is shown in Figure 12, and its waveforms are sketched in Figure 13. The above analytical investigation was corroborated by the experimental data obtained by the authors from a number of special measurements. There are 14 figures and 5 Soviet references.

SUBMITTED: April 18, 1957

Card 4/4

24225

S/142/61/004/001/004/008
E140/E163

9.6000 (1067,1331)

AUTHORS: Danilenko, A.I., and Samovlo, K.A.

TITLE: Analysis of the error of phase-shift frequency meters

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1961, Vol.4, No.1, pp. 55-63

TEXT: The phase-shift frequency meter is based on the use of a four-pole with linear phase characteristic in the operating range of frequencies, and the measurement of the phase-shift of the unknown signal after passage through the four-pole. The authors' previous work (Ref.1: A.I. Danilenko, Radiotekhnika, 1957, Vol.12, No.5, 67. Ref.2: A.I. Danilenko, A. Avdeyenko. Radio, 1958, No.12, 28) indicates that the method is simple and precise. There are three basic sources of error: instability of the four-pole frequency-phase characteristic; instability of the group delay of the four-pole; phase meter error. Departure from nonlinearity of the four-pole characteristics is neglected in this analysis since it can be taken into account in the initial calibration. Assuming independence of the three sources of error they can be added in quadrature. A qualitative idea of the error behaviour is

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given in Fig.2, where δ_ω is the error in the frequency-phase characteristic, δ_τ is the group delay error, δ_φ is the phase meter error, and $\delta_{\text{рез}}$ is the resultant. As the frequency increases the errors δ_ω and δ_φ decrease asymptotically to zero. The error δ_τ decreases as the frequency approaches the frequency of zero phase shift in the four-pole. Furthermore, the rate of approach to zero of δ_φ increases with increase of τ, simplifying the requirements on the phase meter. When the condition

$$\tau \geqslant \frac{\Delta\varphi_{max}}{\Delta\omega_0} \qquad (3)$$

is satisfied, the four-poles may consist of bandpass filters, for example quartz-crystal filters. In the high-frequency band, where the basic source of error is δ_τ, the four-poles may consist of electrical or ultrasonic delay lines. The authors then examine the instrumental error in the dynamic state, where the frequency changes continuously at a given rate, for example in dynamographic work, etc. The dynamic error analysis is based on two assumptions: it is assumed that the dynamic phase characteristic of the four-pole differs little from the static one; and the signal frequency

varies linearly. A general integral expression is found, into which parameters of specific four-poles can be substituted. Examples are given for phase meters using single-tuned and double-tuned resonant filters as the phase-shift network.
There are 3 figures and 5 Soviet references.

ASSOCIATION: Kafedra teoreticheskikh osnov radiotekhniki
Taganrogskogo radiotekhnicheskogo instituta
(Department for Basic Theory of Radio Engineering,
Taganrog Radio Engineering Institute)

SUBMITTED: To the editors of NDVSh, February 24, 1959.
To the present journal, February 4, 1960.

L 25752-65

ACCESSION NR: AP5002035 S/0142/64/007/005/0545/0555

6
2
B

AUTHOR: Samoylo, K. A.

TITLE: Development of the phase-pulse method for second-order near-conservative systems with nonlinear reactance

SOURCE: IVUZ. Radiotekhnika, v. 7, no. 5, 1964, 545-555

TOPIC TAGS: parametric oscillator, nonlinear oscillatory system

ABSTRACT: A further development of the phase-pulse method applicable to systems with arbitrary active and reactive nonlinearities, where oscillations differ greatly from the sinusoidal, is reported. The essence of the method was reported in earlier articles by this author (Radiotekhnika, 1959, 4, no. 1, 43, and 1958, 1, no. 3, 362). The case of an oscillatory circuit with a nonlinear capacitance is dealt with. This procedure for designing such a system is recommended: (1) From the given characteristic of nonlinear reactance, 2—3

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first coefficients b_i are determined (formula P-6); (2) Voltage on the circuit is determined (formula 39) as a function of the amplitude of oscillations R; (3) From the given feedback characteristic (formula 57), the first harmonic of the current flowing in the circuit $J_1(R)$ is determined; (4) Amplitude R_0 is determined (from formula 62); (5) If a phase shift in the feedback circuit is present, a correction is determined from formula 69; (6) The period of oscillations can be determined from formula 36 or its modification; (7) The oscillatory-voltage vs. time curve is plotted from $U(\tau)$ and $t(\tau)$; transients can be estimated from formulas 67, 68. Orig. art. has: 8 figures and 83 formulas.

ASSOCIATION: none

SUBMITTED: 28Jan64 ENCL: 00

SUB CODE: GP NO REF SOV: 012 OTHER: 000

Card 2/2

SAMOYLO, K.A., kand. tekhn. nauk, dotsent; FEDOSOVA, T.S., inzh.; GORSHENKOV, Yu.N., inzh.

Frequency division using a nonlinear capacitance. Trudy MEI 55:129-144 '65.

Frequency division using a nonlinear capacitance and a negative resistance. Ibid.:145-152 (MIRA 18:10)

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AUTHOR: Samoylo, K. A.; Fedosova, T. S.; Gorshenkov, Yu. N.

TITLE: Frequency division by nonlinear capacitance and negative resistance

SOURCE: Ref. zh. Radiotekhnika i elektrosvyaz', Abs. 10B504

REF SOURCE: Tr. Mosk. energ. in-ta, vyp. 55, 1965, 145-152

TOPIC TAGS: frequency division, frequency divider

ABSTRACT: The problem of frequency division by 2 by means of a nonlinear capacitance is considered. Excitation conditions and resonance curves with and without an inertial nonlinear negative resistance are determined from differential equations and a phase portrait. With ratios 3, 4 and higher, the reciprocal nonlinear capacitance is approximated by a trinomial. The second and third harmonics of current are taken into account. The cases with and without periodic solutions and their stability are considered. A study of the phase-plane topology shows that, with a certain amplitude of the external force, a stable singular point exists and, therefore, the division is possible. However, initial conditions are necessary which would keep the operation near the singular point. Thus, with a sufficient amplitude of synchronizing current and with a sufficient capacitance nonlinearity, a hard excitation results; the system should be somehow excited in order to perform

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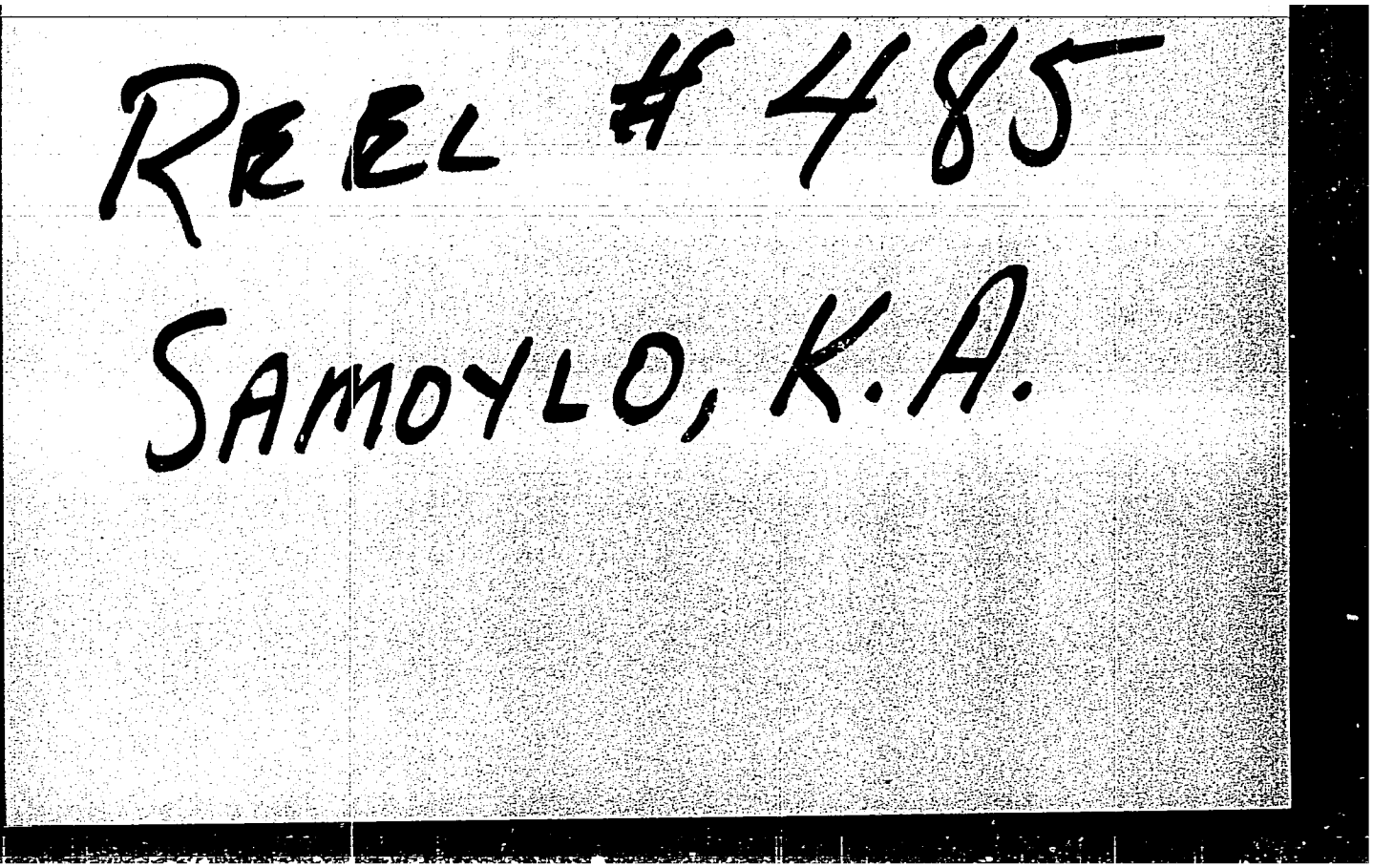
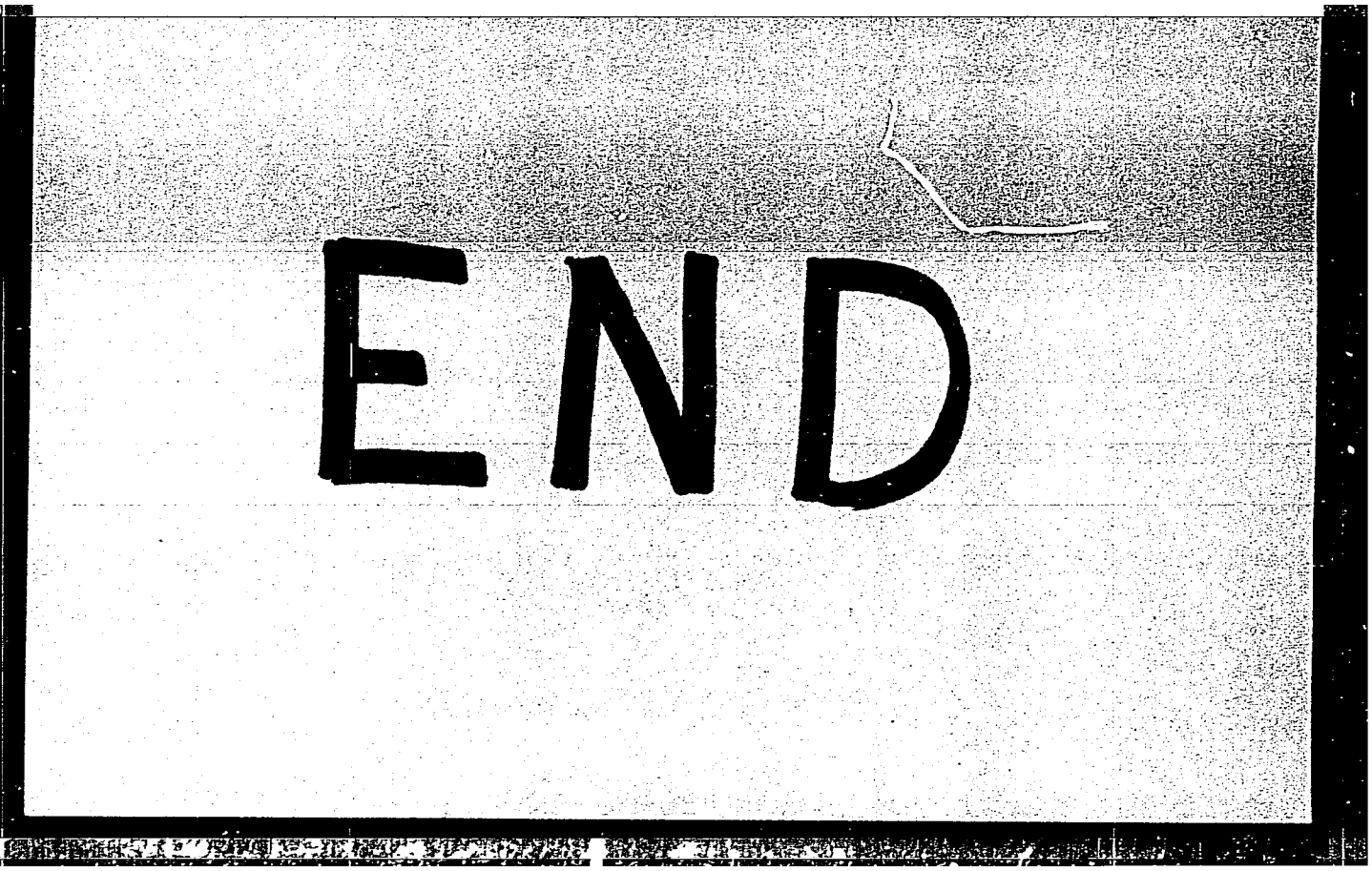
division. On an oscillation collapse, the division is not restored by itself. Stable division can be obtained by connecting an inertial negative resistance (tunnel diode, dynatron oscillator, etc.) to the circuit. In this case, the division band is widened. The nature of oscillation limiting plays an important part in the above phenomena. Experimental studies with a dynatron oscillator corroborated some theoretical claims, specifically, the presence of hysteresis in the system. With the negative resistance, the division by 3, 4, and 5 was observed. Without the negative resistance, only division by 2 was observed. With certain external-current amplitudes, the division by 3 persisted also without the negative resistance, but did not reestablish itself on oscillation collapse. Eleven figures. Bibliography of 1 title. Yu. Kh. [Translation of abstract]

SUB CODE: 09

Card 2/2





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