Diphenyl-chloro-phosphazo-sulfone Aryls

S/079/60/030/05/33/074
B005/B016

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut (Dnepropetrovsk Institute of Metallurgy)

SUBMITTED: May 13, 1959

Card 3/3

S/079/60/030/006/024/033/XX
B001/B055

AUTHORS: Shevchenko, V. I. and Stratiyenko, V. T.

TITLE: Diphenyl-alkoxy- and Diphenyl-aroxy-phosphazo-sulfonaryl Compounds

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 6, pp. 1958 - 1960

TEXT: Diphenyl-chloro-phosphazo-sulfonaryl compounds, as the acid chlorides of aryl-sulfonimido-diphenyl phosphinic acids, react readily with water, alcohols, amines, and other compounds containing an active hydrogen atom. They react still more easily with sodium alcoholates and phenolates forming diphenyl-alkoxy-phosphazo-sulfonaryls (esters of aryl-sulfonimido-diphenyl phosphinic acids) (I, R = alkyl) and diphenyl-aroxy-phosphazo-sulfonaryls (II, R = Ar), respectively:

$$(C_6H_5)_2ClP{=}NSO_2Ar + RONa \xrightarrow{-NaCl} (C_6H_5)_2(RO)P{=}NSO_2Ar.$$

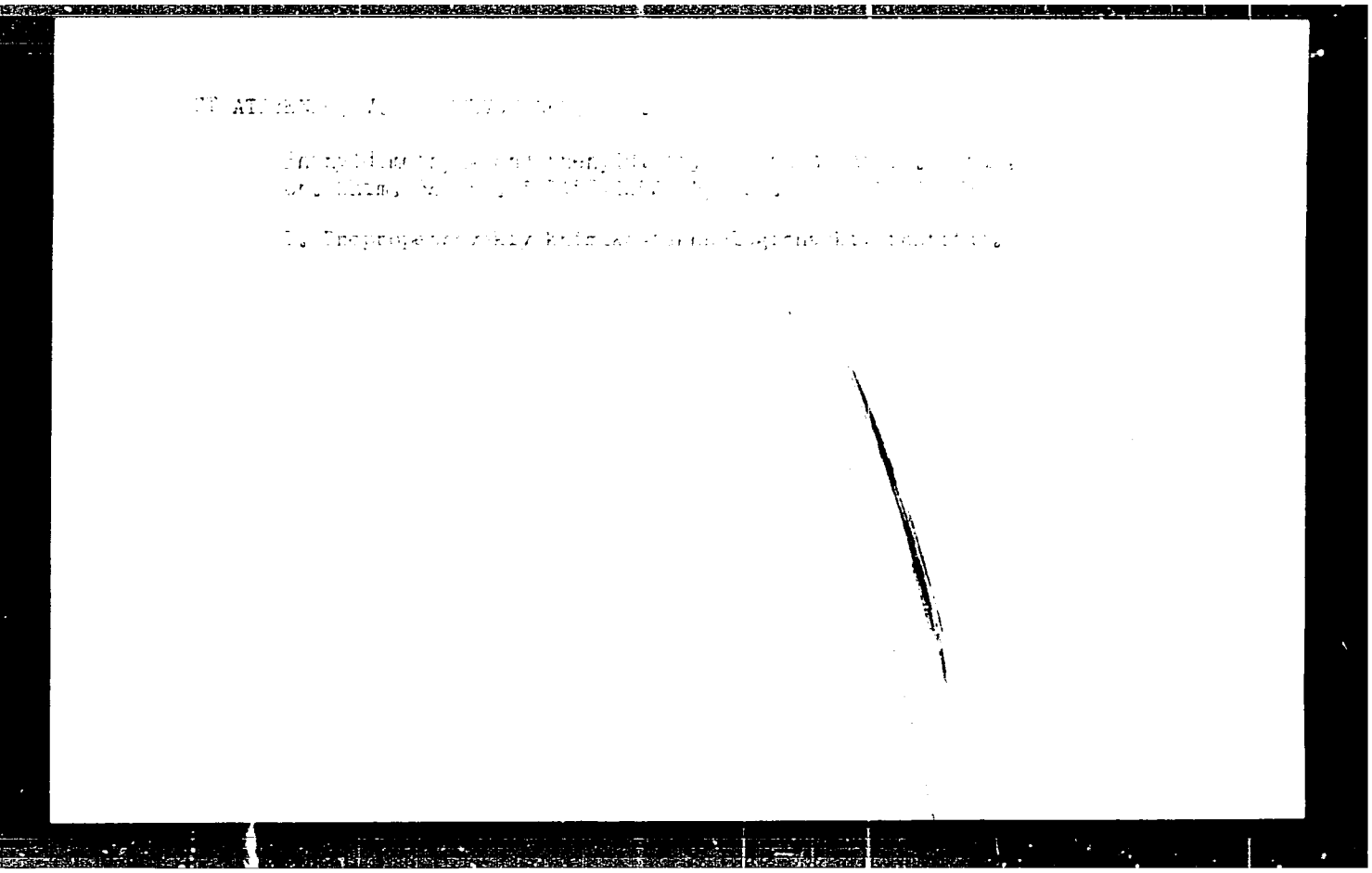
Card 1/2

SHEVCHENKO, V.I., STRATIYENKO, V.T.

Reaction of arylphosphorus chlorides with acid amides.

Khimiya i Primeneniye Fosfororganicheskikh Soyedineniy (Chemistry and application of organophosphorus compounds) A. [illegible] Ed. Publ. by Kazan Affil. Acad. Sci. USSR, Moscow 1962, [illegible] pp.

Collection of complete papers presented at the [illegible] Kazan Conference on Chemistry of Organophosphorus Compounds.



L 52794-65 EWT(m)/EPF(c)/EWP(j)/T/ Pc-4/Pr-4 IM

ACCESSION NR: AP5016190 UR/0079/64/034/012/3954/3955

AUTHOR: Shevchenko, V. I.; Stratiyenko, V. T.; Pinchuk, A.M.

TITLE: Triphenylphosphazosulfonylaryls

SOURCE: Zhurnal obshchey khimii, v. 34, no. 12, 1964, 3954-3955

TOPIC TAGS: organic phosphorus compound, organic sulfur compound, chloride, organic amide

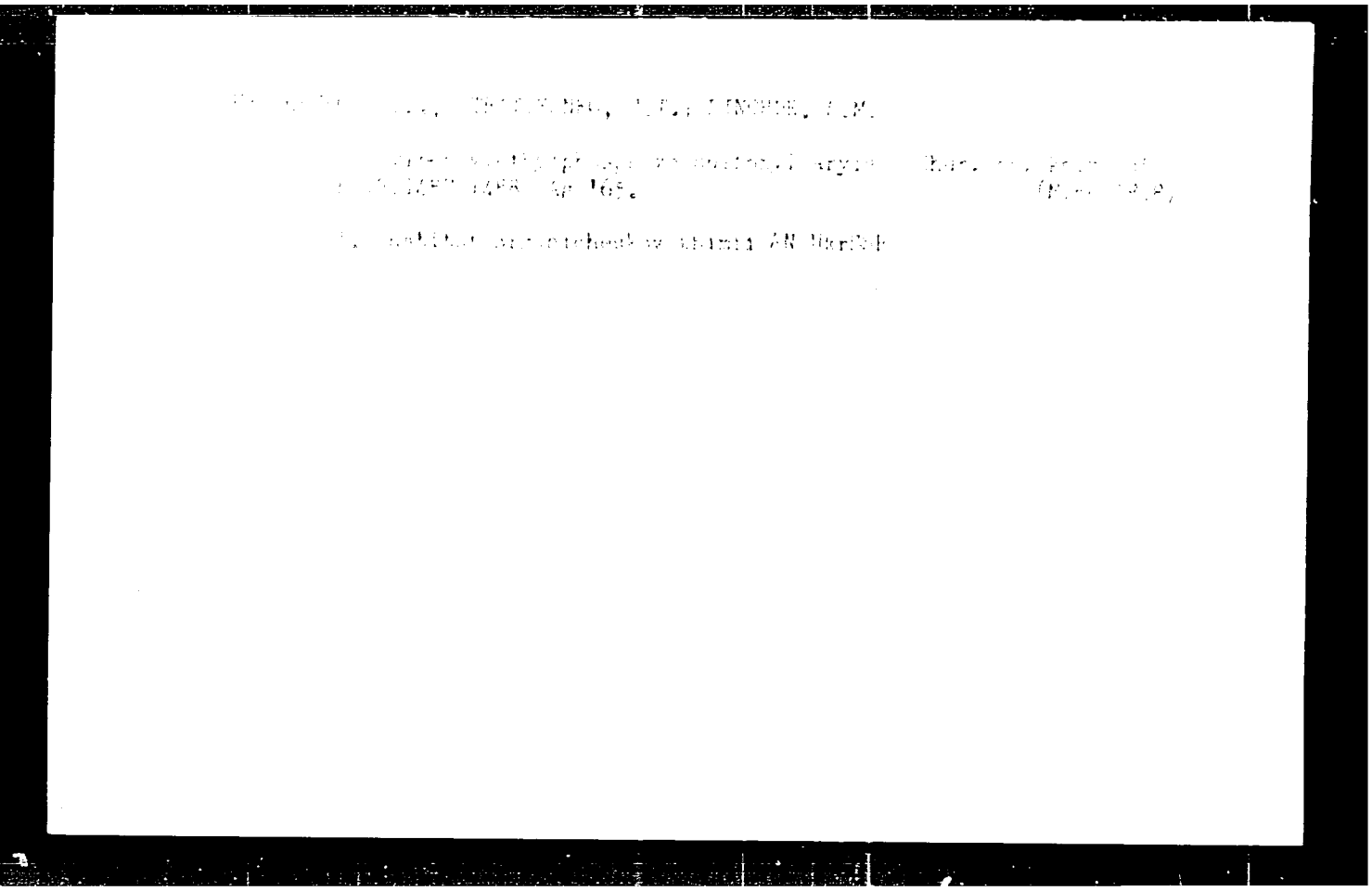
Abstract: A Kirsanov reaction takes place under the action of triphenylphosphorus dichloride on arenesulfamides to form triphenylphosphazosulfonylaryls in 89-94% yield. The reaction rates of diphenylphosphorus trichloride and triphenylphosphorus dichloride with arenesulfamides are approximately the same. Orig. art. has 1 formula and 1 table.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry Academy of Sciences, Ukrainian SSR)

SUBMITTED: 30Sep63 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 003 OTHER: 001 JPRS

Card 1/1



L 21859-66 EWP(j)/EWT(m) RM

ACC NR: AP6012652 SOURCE CODE: UR/0079/65/035/002/0363/0364

AUTHOR: Shevchenko, V. I.; Stratiyenko, V. T.; Pinchuk, A. M.

ORG: Institute of Organic chemistry, AN UkrSSR (Institut organicheskoy khimii AN UkrSSR)

TITLE: Phenyl-p-tolylchlorophosphazosulfonylaryls

SOURCE: Zhurnal obshchey khimii, v. 35, no. 2, 1965, 363-364

TOPIC TAGS: amine, alcohol, hydrolysis, chemical reaction, organic sulfur compound, organic phosphorous compound, chlorinated organic compound

ABSTRACT: Phenyl-p-tolylchlorophosphazosulfonylaryls react readily with amines, alcohols, and other compounds containing an active hydrogen atom. Cold water and moist air slowly hydrolyze these aryls with the formation of arenesulfonylamides of phenyl-p-tolylphosphonic acid. The reaction temperature is 125°, and the reaction time is 0.15 hours. Orig. art. has: 2 tables. [JPRS]

SUB CODE: 07 / SUBM DATE: 13Dec63 / ORIG REF: 001 / OTH REF: 001

Card 1/1 nst

L 29286-66 EWP(j)/EWT(m) RM

ACC NR: AP6019326 SOURCE CODE: UR/0079/65/035/008/1487/1488

AUTHOR: Shevchenko, V. I.; Stratiyenko, V. T.; Pinchuk, A. M. 24 B

ORG: Institute of Organic Chemistry, AN UkrSSR (Institut organicheskoy khimii AN UkrSSR)

TITLE: Phenylbenzylethylphosphazosulfonylaryls

SOURCE: Zhurnal obshchey khimii, v. 35, no. 8, 1965, 1487-1488

TOPIC TAGS: sulfonic acid, organic azo compound, chlorinated organic compound, organic synthetic process, cyclic group

ABSTRACT: Phenylbenzylethylphosphazosulfonylaryls (A) can be prepared by oxidative introduction of an $ArSO_2N=$ group into phenylbenzylethylphosphine by means of Na salts of sulfonic acid chloramides or by means of sulfonic acid azides:

$$ArSO_2NNaCl + P(Ph)(CH_2Ph)Et \rightarrow NaCl + ArSO_2N{=}P(Ph)(CH_2Ph)Et\ (A)$$
$$ArSO_2N_3 + P(Ph)(CH_2Ph)Et \rightarrow N_2 + A$$

By using these reactions, compounds A with Ar = Ph, $p\text{-}MeC_6H_4$, $o\text{-}MeC_6H_4$, and $\alpha\text{-}C_{10}H_7$ were prepared. They were crystalline substances melting at 107-8°, 102-3°, 125-6°, and 105-6°, resp. Orig. art. has: 1 formula and 1 table. [JPRS]

SUB CODE: 07 / SUBM DATE: 08Jun64 / ORIG REF: 001 / OTH REF: 002

Card 1/1 UDC: 546.185

AR[illegible]OV, Nikolay Gerasimovich; GI[illegible]M[illegible]EV, Gilemdar Rizvanovich; STRATIYEV, Valentin Ivanovich; [illegible]ST[illegible]HE[illegible]KAYA, G.A., red.

[Frequency-type remote control system for oil fields] Chastotnaia sistema telemekhanizatsii nefteprompyslov. Ufa, Bashkirskoe knizhnoe izd-vo, 1962. 83 p. (MIRA 17:7)

STRATKOV, T.

"Trade-Union Organizations Fight for Economy of Electric Power."
p. 40-(3) of cover,
(LEKA PROMISHLENOST, Vol. 3, No. 2, 1954, Sofiya, Bulgaria)

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 4
No. 5, May 1955, Uncl.

STRATKOV, T.

Ways for development of the rationalization and invention movement. p. 33.
(Leka Promishlenost, Vol. 5, no. 12, 1956, Bulgaria)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 6, June 1957, Uncl.

STRATKOV, T.

STRATKOV, T. For the introduction of traionalization suggestions in the light and food industry. p.11.

Vol. 6, no. 3, Mar. 1956 RATSIONALIZATSILA Sofiya, Bulgaria

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 5, No. 10 Oct. 1956

...ATICV, I.

GRATICV, I. For close cooperation between the committees for the mass rationalization of labor and the technical economic councils. p. 1.

Vol. , No. 8, Aug. 1956.
NAUCHNA MYSL.
TECHNOLOGY
Sofiia, Bulgaria

So: East European Accession, Vol. 6, No. 3, March 1957

STRATKOV, T.

"More active participation od women in the rationalizing movement."

p. 9 (Ratsionalizatsiia) Vol. 7, no. 9, Sept. 1957
Sofiia, Bulgaria

SO: Monthly Index of East Eurppean Accessions (EEAI) LC. Vol. 7, no. 4, April 1958

STRATKOV, Traicho

Road wide open to new initiatives and rationalization movement. Tekstilna prom 13 no. 4:15-18 '64.

1. Chief of Section in the Central Committee of the Trade Union of the Workers in the Light Industry and the Food Industry.

AGUL'NIK, M.A., professor; KORNEYEV, I.P., dotsent; STRATONITASKAYA, G.A.

Microflora of pork brisket during the process of salting in 1954.
Veterinariia 32 no.3:78-79 Mr '55. (MLRA 8:4)

1.Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti.
(PORK--BACTERIOLOGY)

STEPANOV, K. A.

Bee Culture - Equipment and Supplies

Molded hive from plant fiber materials. Pchelovodstvo 30, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

STRATONOV, N. G.

USSR/Engineering Turbines, Steam Repairs Jan 49

"Duration of Opearting Period of Steam Turbines Between Major Overhauls," B. F. Dobkin, N. G. Stratonov, Engineers, 3 pp

"Eldk Stants" No 1

Operating Codebook calls for major overhauls annually without regard to operating hours. Authors compiled 2-year data on repairs and breakdown of turbines to use as basis for recommending changes in overhaul schedule. Lists data in tabular form by operatind periods between overhauls, and analyzes causes of breakdown. Recommend 10,000 - 12,000 hours operation between overhauls (gradual implementation), excluding new installations (one-year overhaul, initially).

PA 55/49T53

PA 38/49T37

USSR/Engineering — Mar 49
Turbines
Condensers

"An Efficient Condenser Arrangement for Thermification Turbines," M. G. Stratonov, Engr, 1 p

"Elek Stants" No 3

Discusses optimum choice of cooling surface for condensers. Turbine type AP-25-1 has cooling surface of 1,300 sq m, which works well in winter, but forces turbine to work at reduced vacuum in summer. Another type, AT-25-1, has 1,900-sq-m heating surface, which secures sufficient vacuum

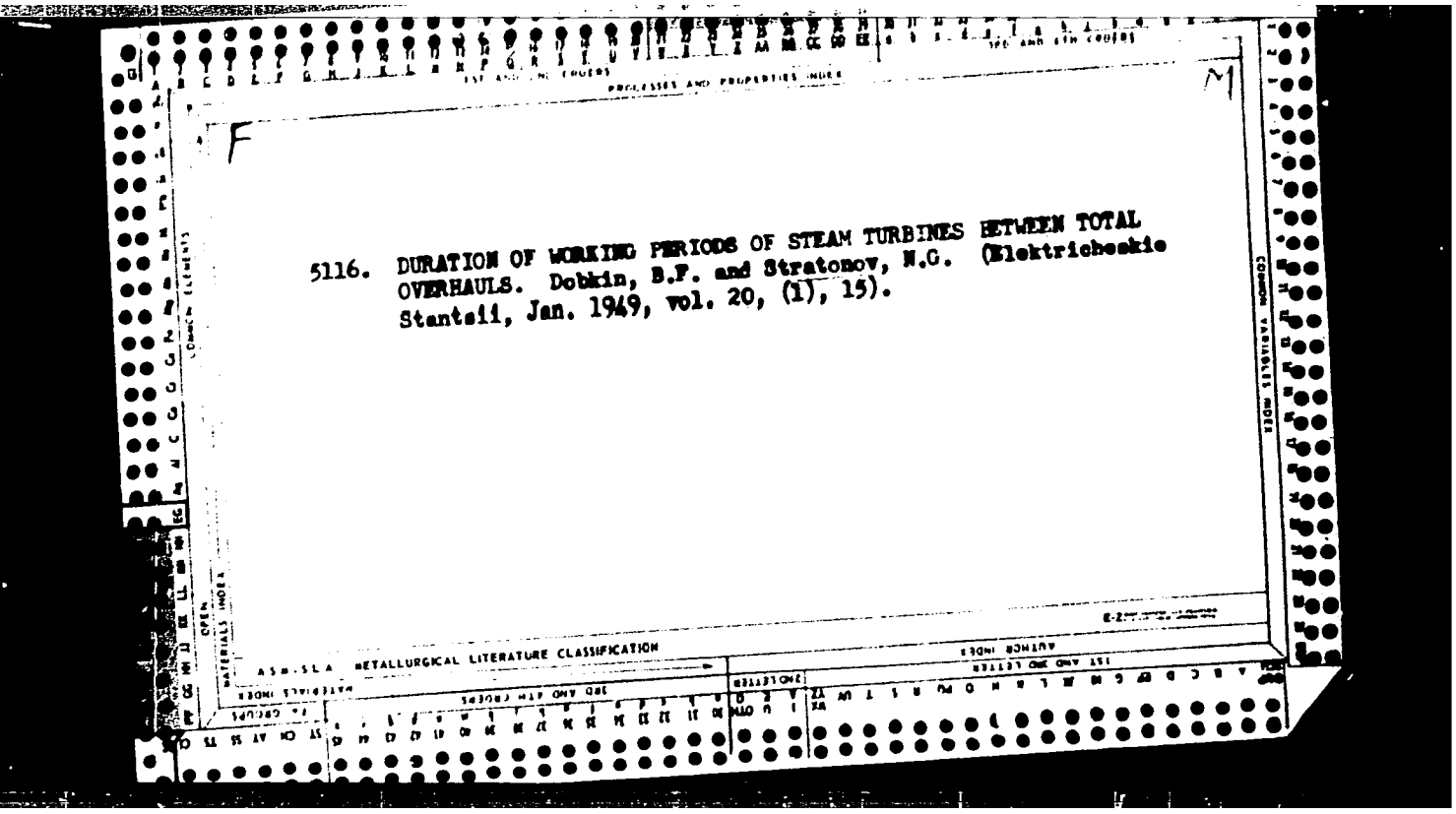
[redacted] 38/49T37

USSR/Engineering (Contd) — Mar 49

in summer, but is wasteful in winter. Suggests and tests crosspiece connecting water chamber of second flow of rear half with water chamber of first flow of front half. fitted with valve for operation in summer.

STRATONOV, M. G. [redacted]

38/49T37



F

5116. DURATION OF WORKING PERIODS OF STEAM TURBINES BETWEEN TOTAL OVERHAULS. Dobkin, B.F. and Stratonov, N.G. (Elektricheskie Stantsii, Jan. 1949, vol. 20, (1), 15).

1. STRATONOV, M. G.

2. USSR (600)

3. Water hammer

4. Kinetic energy of water hammer. Rab. energy. 3 No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

STRATONOV, N.G.

Utilization of waste steam. Energetik 4 no.4:38 Ap '56.
(MLRA 9:7)
(Waste heat)

STRATONOV, N.G.

Cleaning the water level indicator glasses of condensers. (MLRA 10:10)
Energetik 5 no.8:40 Ag '57.
(TURBINES)

STRATONOV, N.G.

STRATONOV, N.G.

Scavenging the Shukhov-Berlin A-7 boiler. Energetik 5 no.9:38 S '57. (MIRA 10:10)
(Boilers)

STRATONOV, N.G.

On wear in tube surfaces of boiler installations. Energetik 5 no.9:39 S '57. (MIRA 10:10)
(Boilers)

MARSHAK, Yu.L.; ROMADIN, V.P.; STRATONOV, N.G., inzh., red.; RADZYUKEVICH, Ye.I., red.izd-va; BORUNOV, N.I., tekhn.red.

[High-temperature wet-bottom furnaces designed by the All-Union Heat Engineering Institute] Topki VTI s vysokim shlakoulavlivaniem. Moskva, Gos.energ.izd-vo, 1958. 95 p. (MIRA 12:2)
(Furnaces)

STRATONOV, N.G.

Utilizing the drainage system for heating. Energetik 6 no.11:37 N '58. (MIRA 11:11)

(Steam engineering)

STRATONOV, N.G., inzh.

Saving electric power in station auxiliaries of steam power plants. Energetik 8 no.4:3-6 Ap '60. (MIRA 13:8)
(Electric power plants)

STRATONOV, N.G.

Concerning the tightening of packing gland compensators.
Energetik 9 no.2:36 F '61. (MIRA 16:7)

(Steampipes)

STRATONOV, N.G.

Measures for increasing the operational reliability of heat and power equipment. Energetik 13 no.3:40 Mr '65. (MIRA 18:7)

83385

Z/037/60/000/005/026/056

9.4160 E192/E382

AUTHORS: Stratonov, Oleg and Jedlička, Miroslav

TITLE: Multi-alkaline Photocathodes

PERIODICAL: Československý časopis pro fysiku, 1960, No. 5, pp. 425 - 429

TEXT: The characteristics of multi-alkaline photocathodes were first described by Sommer (Ref. 1). Such cathodes were produced and investigated at the Research Institute for Vacuum Electrotechnology in Czechoslovakia during the last three years. Three methods of producing multi-alkaline layers were investigated. The first method is based on a simultaneous single-stage evaporation of all the alkalis (Sb-Na-K-Cs). In the second method the alkalis are evaporated successively (in three stages), and the base layer is successively activated by individual metals. The advantage of this method lies in the fact that it is possible to control the quantity of the evaporated alkalis. The method of combined (two-stage) evaporation is as follows: the alkali metal Na is first evaporated on a base layer of Sb and then the two remaining

Card 1/3

Multi-alkaline Photocathodes

metals, K and Cs, are deposited. The majority of the cathodes produced were oxidized before completing their processing, since, in this way, it was possible to increase their sensitivity. The overall sensitivity of the photocathodes so prepared was 200 μA/Lm. This is the sensitivity relative to the current temperature of a tungsten bulb of 2 250 °K. The spectral sensitivity curves of the cathodes of the three types are given in Fig. 1. It is seen that for all the curves the spectral sensitivity at 600 mμ is 30-50% of the maximum sensitivity. This effect is very important if the photocathodes are to be employed in colour television or for colorimetric purposes. Fig. 3 gives the spectral sensitivity and spectral transmittivity of Sb-Cs and Sn-Na-K-Cs photocathodes which were chosen so that the spectral transmittivity in the vicinity of 600 mμ was approximately the same. It is seen that the relative emissivity at 600 mμ of the Sb-Cs photocathode is approximately 1/2 that of the multi-alkaline photocathode at the same transmittivity. From the investigation it is concluded that though the

83385
Z/037/60/000/005/026/056
E192/E382

Multi-alkaline Photocathodes

preparation of a multi-alkaline photocathode is complex and difficult, the cathode is very efficient and can be successfully employed in the photomultipliers for nuclear physics and in certain television camera tubes. The authors express their thanks to M. Dvořák and P. Vilím for advice and preparation of the samples.
There are 3 figures and 7 references. 3 English, 2 Soviet and 2 Czech.

ASSOCIATION: Vyzkumný ústav pro vakuovou elektrotechniku, Praha (Research Institute for Vacuum Electrotechnology, Prague)

Card 3/3

[illegible], . .

[illegible] activity in the [illegible] in tuberculosis under clinical and experimental conditions. Kazan. [illegible] gos. med. inst. 14:555-556 '64. (MIRA 18:[illegible])

1. Laboratoriya kursa tuberkuleza (zav. - prof. [illegible]) i kafedra patologicheskoy fiziologii (zav. - prof. [illegible]) Kazanskogo meditsinskogo instituta.

[illegible], A. I., jt. au.

Physical characteristics of forest soils and their change under the influence of forestry work Leningrad, Goslestekhizdat, 1935. 1-6 p. (54-46981)

SD387.S8

STRELYAYEV, A. I.

23435 sostoyaniye i perspektivy introduktsii bereskletov (evonymus) v sssr. v sb: issledovaniya po les. khoz - vy. l., 1948 /na obl: 1949/ s. 153-74

SO: LETOPIS NO. 31, 1949

STRATONOVICH, A. I.

Cultivation of the spindle tree in the USSR Moskva, Goslesbumizdat, 1952. 118 p. map.
(54-17615)

SB291.S6S82

STRATONOVICH, A.I.

STRATONOVICH, A.I., laureat Stalinskoy premii.

Establishing fruit-bearing trees in forest stands. Geog.sbor. no.2:134-144 '53. (MLRA 7:2)
(Forrestation) (Fruit culture)

STRATONOVICH, Arseniy Ivanovich

(Central Sci-Res Inst of Forestry), Academic degree of Doctor of Agricultural Sciences, based on his defense, 24 March 1955, in the Council of the Inst of Forestry, Acad Sci, USSR, of his dissertation entitled: "Spindle trees of the USSR and their industrial significance."

Academic degree and/or title: Doctor of Agricultural Sciences

SO: Decisions of VAK, List no. 18, 10 Sep 55, Byulleten' MVO SSR, No. 17, Sep 56, Moscow, pp 9-16, Uncl. JPRS/NY-435

STRATONOVICH, A.I.

Distribution of the warty spindle tree along the northern limit of its habitat and some theoretical conclusions. Geog. sbor. no.5: 5-15 '55. (Spindle tree) (MLRA 9:6)

KHARITONOVICH, Fedor Nikolayevich, professor; STRATONOVICH, A.I., redaktor; OSOKINA, A.M., redaktor izdatel'stva; SHITS, V.P., tekhnicheskiy redaktor

[The European spindle tree and how to grow it] Beresklet evropeiskii i agrotekhnika ego vyrashchivaniia. Moskva. Goslesbumizdat, 1956. 108 p. (MLRA 10:2)

(Spindle tree)

STRATONOVICH, A.I.

USSR/Forestry - Forest Cultures. K.

Abs Jour : Ref Zhur - Biol., No 21,1958, 95842

Author : Stratonovich, A.I., Shevlyakova, T.Ya.

Inst : Leningrad Scientific-Research Institute of Forestry.

Title : Plantings of Conifers on Old Cutovers (Reconstruction of Poor Deciduous Undergrowth).

Orig Pub : Byul. nauchno-tekhn. inform. Leningr. n.-i. in-ta lesn. kh-va, 1957, No 4, 34-43.

Abstract : During reconstruction of low-value plantations, it is proposed to prepare the strips by plowing the tree-shrub and grass vegetation, with subsequent rolling and packing of the cover on which the plantings are set. By investigations in the Ordzhonskiy, Gatchinskiy and Siverskiy leskhozes, a difference was established in the taking root of trees created by planting or seeding.

Card 1/2

Abs Jour : Ref Zhur - Biol., No 21, 1958, 95842

Planting is acknowledged to be more effective on rich [illegible] proves to be a B horizon of heavy loam on the surface of the cover, [illegible] observed on poor soils. The most favorable conditions for seeding are on soils with a closer occurrence of a mineral layer. A layer on the surface of the covering of light mechanical composition proves to have a positive influence on the growth of the trees. In dense undergrowth with height 5-6 m, the width of the corridors must be not less than 3 m. In wider corridors, the height growth is 44, diameter of root collar 60 and projected area of crown 33% higher than in the 3-meter corridors. A table is cited of comparative growth data for spruce, pine and larch. -- V.V. Protopopov.

Card 2/2

STRATONOVICH, N.I.

Teaching epidemiology at a medical institute. Zhur. mikrobiol., epid. i imm. 41 no. 2:133-134 F '64. (MIRA 17:9)

1. Smolenskiy meditsinskiy institut.

[illegible], [illegible]

[illegible]ICH, [illegible], [illegible]A, Ye. P., and [illegible], [illegible] "The Weil-Feliz reaction in organisms inoculated with vaccine prepared by the [illegible]-Vorontsovskaya method", Trudy [illegible] med. in-ta, Vol. II, 194[illegible], p. [illegible]3-[illegible].

So: U-4393, 19 August 53, (Letopis 'Zhurnal 'nykh Statey', No. 22, 1949).

S/262/62/000/010/017/024
I007/I207

AUTHOR: Stratonovich, N. N.

TITLE: Field testing of new winter-type crankcase lubricants

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 42. Silovyye ustanovki, no. 10, 1962, 68, abstract 42.10.387. "Dokl. Nauchno-tekhn. konferentsii molodykh spetsiyalistov lesn. prozi-va Sverdl. obl. po itogam rabot 1960 g." Sverdlovsk, 1961, 65-67

TEXT: The department for transportation and hauling machinery of the Ural'skii lesotekhnicheskii Institut (Ural Forestry-Engineering Institute) tested new types of crankcase lubricants prepared from sulfur-containing additive-type oil products. Three types of lube oils were tested on 18 tractors at temperatures down to 38°C. As shown by tests, these oils, in terms of antiwear and starting properties during winter operation, are superior to the best grades of standard lubricants, permitting the starting at a temperature as low as −40°C without preheating the engine. The lube oil of the Дп-8 (Dp-8) type prepared from sulfur-containing oil products of the Eastern oil fields is recommended for large-scale production.

[Abstracter's note: Complete translation.]

Card 1/1

[illegible], A. I.

USSR/Physics - Waves
Equations

Mar 52

"Waves in Cylindrical Plasma," R. L. Stratonovich, Chair of Oscillations

"Vest Moskov U, Ser Fiz, Mat, i Yest Nauk, No 2, pp 31-40

Analyzes two-dimensional longitudinal waves in plasma bound by side walls of a cylindrical discharge tube of specified radius. Derives and solves eqs of waves, using linear approximations sufficient for small amplitudes. Received 23 Jul 51.

242T103

KUZNETSOV, P.I.; STRATONOVICH, R.L.

Long heterogeneous lines. Radiotekhnika 8 no.6:14-22 N-D '53.
(Radio lines) (Radio, Shortwave) (MIRA 11:6)

STRATONOVICH, R. L., TIKHONOV, V. I., KUZNETSOV, P. I.

"Passage of Certain Random Functions Through Linear Systems", Avtomatika i Telemekhanika, Vol 14, No 2, 1953, pp 144-163.

Discusses linear systems in which the input and output of a signal is connected integrally by means of the kernel (the transfer function of a system), depending on the time and parameter.

Determines generalized correlative functions as coefficients of expansion of characteristic functions of n-multiple distributions of probabilities and establishes the correlations, binding the output correlative functions to the input functions. For the case of stationary output signals the characteristics of proximity of certain functions of the density of probability (sharp attenuation and possession of one peak) to the density of Gaussian distribution is discussed. Other results arising from transient random signals through linear systems, may be found in in the works of A. N. Kolmogorov (Jubilee Collection, Acad Sci USSR, Moscow, 1947), where full analysis of the case of stationary disturbances and constant transmitting function of the system is given; cf. V. S. Pugachev (Izvestiya Akademii Nauk, Seriya Matematika, 1953, No 5, 401-420) and Zadeh (Proc. J.R.E., 1950, Vol 38, No 11, 1342-1345). (RZhMekh, No 11, 1954)
SO: Sum. No. 443, 5 Apr. 55

KUZNETSOV, P.I. (Moskva), STRATONOVICH, R.L. (Moskva); TIKHONOV, V.I., (Moskva).

Transmission of random functions through nonlinear systems. Avtom. i telem. 14 no.4:375-391 Jl-Ag '53. (MLRA 10:3)
(Automatic control)

STRATONOVICH R.L.

V 895 AEC-tr-2324
TRANSIENT PROCESSES IN PLASMA WITH PLANE BOUNDARIES. R. L. Stratonovich. Translated from Zhur. Eksptl'. i Teoret. Fiz. 24, 269-78(1953). 12p. Available from Associated Technical Services (Trans 61G6R), East Orange, N. J.

Boundary values are found in the case of processes in semi-infinite space with a given potential applied to a plane reflecting electrode, bounding the plasma, for the deviation from the equilibrium distribution function, for the intensity of the electric field, and for the gradient of the charge density. A method is given for the determination of transient processes in a semi-infinite plasma and also in the layer between two electrodes to which a potential difference is applied for a special form of the stationary distribution function. Expressions are obtained for the reaction of the plasma to different perturbations, in particular to a unit step function [H(t) = 1 for $t \geq 0$, H(t) = 0 for $t < 0$]. (auth)

STRATONOVICH, R. L.

USSR

Kuznecov, P. I., and Stratonovič, R. L. Electromagnetic processes in a multiconductor system. Izv. Akad. Nauk SSSR. Otd. Tehn. Nauk 1954, no. 9, 3–23 (1954). MS (Russian)

The authors derive, starting from Maxwell's equations, the transmission-line equations for a system of thin, parallel, imperfectly conducting cylindrical wires. Only those modes which in the limit of perfect conductivity become transverse electromagnetic are considered. Errors introduced by assuming the wires to be thin are of the order of the square of the ratio of thickness to wavelength or to distance between wires, whichever is smaller. The method is then applied to the case of a parallel wire line over a perfectly conducting ground. The two modes of propagation of such a line are investigated in detail. *J. Shmoys* (New York, N. Y.).

62 (1)

Π = F/W

STRATONOVICH, R. L. FD 227

USSR/Electronics

Card 1/1

Author : Kuznetsov, P. I. and Stratonovich, R. L.

Title : The optimum transfer between two different uniform long lines

Periodical : Radiotekhnika 9, 13-20, Mar/Apr, 1954

Abstract : Rules are given for selecting the optimum transfer between two uniform lines with aid of a lengtn of nonuniform line. The external parameters of a four-terminal network which is equivalent to a non-uniform line can be more economically calculated with Riccati's differential equation for the coefficient of reflection than with A. L. Fel'dshteyn's method. Minimum reflected power in the given frequency band is used as a criterion for optimum line. Four references: 4 USSR.

Institution :

Submitted : September 27, 1952

Stratonovich, R. L.

USSR/Electronics - Wave Propagation along wires FD-1056

Card Pub 90-4/12

Author : P. I. Kuznetsov and R. L. Stratonovich

Title : Non-homogeneous long lines with variable propagation factor

Periodical : Radiotekhnika 9, 43-45, Jul/Aug 1954

Abstract : Results of previous papers by the same authors (Radiotekhnika 8, Nov/Dec 1953; 9, Mar/Apr 54) were obtained on the assumption that the propagation factor is invariable all along a line. In the present paper the authors show that this limitation can be removed by replacing the variables in telegraphs equations, while they retain all the formulae obtained in their previous works. Three references; 2 USSR, 1953 and 1954. Tables.

Institution : --

Submitted : 27 September 1952

[illegible], I. I., [illegible], R. L., and [illegible], V. I.

"Passage of Random Functions Across Nonlinear Systems,"
Avtomatika i Telemekhanika, Vol 15, No 3, pp 200-205, 1954

Examines the nonlinear problem of the best approximation of some function f(t) by the method of choosing moment functions. When certain assumptions are made this problem reduces to the solution of a system of algebraic equations replacing the integral equations.
(ZMatMek, No 4, 1953)

SO: Sum, No 704, 5 Aug 55

STRATONOVICH, R. L.

4
1-15/61

★Kuznetsov, P. I.; Stratonovich, R. L.; and Tikhonov, V. I. On the duration of excursions of random functions. Translated by Morris D. Friedman, 572 California St., Newtonville 60, Mass., 1956. 14 pp.
Translated from Z. Teh. Fiz. 24 (1954), no. 1, 102–112.
The original Russian article was reviewed in MR 16, 269.

MT

STRATONOVICH, R. L.

USSR/Physics - Brownian Motion FD-620

Card 1/1 : Pub. 146-10/18

Author : Kuznetsov, P. I.; Stratonovich, R. L.; and Tikhonov, V. I.

Title : Correlation functions in the theory of Brownian motion; Generalization of the Focker-Planck equation

Periodical : Zhur. eksp. i teor. fiz. 26, 189-207, February 1954

Abstract : Generalized correlation functions are used in a theory of Brownian motion which goes beyond the framework of Markov processes and uncorrelated random functions. For a sufficiently short time of correlation a differential equation is derived which generalizes the equation of Focker and Planck. It is shown that in special cases the theory discussed in this article reverts to the more usual theory of Brownian motion.

Institution : Moscow State University

Submitted : July 10, 1953

STRATONOVICH, R. L.

Math 5

Kuznecov, P. I., Stratonovič, R. L., and Tihonov, V. I. Quasi-moment functions in the theory of random processes. Doklady Akad. Nauk SSSR (N.S.) 94, 615–618 (1954). (Russian)

Let $t_1, \cdots, t_n$ be n time-points of the range of a random process $\xi(t)$. Denote by

$$f_n(u_1, \cdots, u_n; t_1, \cdots, t_n) = E\left\{\exp\left[i\sum_1^n u_\alpha \xi(t_\alpha)\right]\right\}$$

the characteristic function of the joint distribution of the random variables $\xi(t_1), \cdots, \xi(t_n)$. The quasi-moment functions $b_p(t_{\alpha_1}, \cdots, t_{\alpha_p})$ are defined by the relation

$$f_n(u_1, \cdots, u_n; t_1, \cdots, t_n) \times \exp\left\{-i\sum_{\alpha=1}^n s(t_\alpha)u_\alpha - \frac{i^2}{2}\sum_{\alpha_1,\alpha_2=1}^n r(t_{\alpha_1}, t_{\alpha_2})u_{\alpha_1}u_{\alpha_2}\right\} = \sum_{p=0}^\infty \frac{i^p}{p!}\sum_{\alpha_1,\cdots,\alpha_p=1}^n b_p(t_{\alpha_1}, \cdots, t_{\alpha_p})u_{\alpha_1}\cdots u_{\alpha_p}$$

with $b_0 = 1$.

Here $s(t)$ and $r(t_1, t_2)$ are given functions. The author expresses the quasi-moment functions in terms of the cumulant functions and extends his definition to the more general situation of two correlated random processes. The transformation of quasi-moment functions and their use in connection with stochastic differential equations is briefly discussed. *E. Lukacs* (Washington, D. C.).

STRATONOVICH, R.L.

USSR.

Kuznecov, P. I., Stratonović, R. L., and Tihonov, V. I. On the effect of electrical fluctuations on a vacuum-tube generator. Dokl. Akad. Nauk SSSR (N.S.) 97, 639–642 (1954). (Russian)

The probability distribution is computed for the voltage amplitude across the tank circuit of a vacuum-tube generator fed by a noise source. The noise fluctuations are assumed to be slow compared to the self-oscillations of the vacuum-tube circuit which would exist in the absence of the noise source. The Einstein-Fokker equation is used in the derivation. The result shows three states of the oscillator, the quiescent, the transition state, and the state of oscillation. The limits between any two states are given as functions of the tube and circuit parameters and the characteristics of the noise source. *H. A. Haus.*

STRATONOVICH, R.L.

The Effect of Electrical Fluctuations on a Vacuum Tube Oscillator. P. I. Kuznetsov, R. L. Stratonovich, and V. I. Tikhonov. (*Zhurnal Experimentalnoi i Teoreticheskoi Fiziki*, May, 1955, pp. 509–523.) *Soviet Physics - JETP*, Nov., 1955, pp. 510–519. Translation. Derivation of expressions of amplitude and phase for the one-dimensional probability density functions and description of an approximation method for the determination of the correlation functions.

3

STRATONOVICH, R.L.

AID P - 1451

Subject : USSR/Electricity

Card 1/2 Pub. 27 - 2/36

Authors : Kuznetsov, P. I, and Stratonovich, R. L., Moscow

Title : Electromagnetic phenomena in a two-wire system

Periodical : Elektrichestvo, 2, 5-13, F 1955

Abstract : In the first part of the article, the authors examine a symmetric two-wire line on which an opposite wave is impressed. A correction is found to the propagation constant which depends on the conductivity of the wires. Expressions for the electric and magnetic fields of the above wave are obtained in series form.

The first terms of the series represent the first harmonics which depend on the proximity of the wires. This permits restriction to a small number of harmonics. The method of investigation is also applied to an infinite multi-wire

STRATONOVICH, R. L.

536.75

8722. The entropy of a system consisting of a random number of particles. R. L. STRATONOVICH. *Zh. eksper. teor. Fiz.*, 28, *No.* 4, 409–21 (1955) In Russian.

In a small volume within a fluid the number of molecules is subject to random fluctuations. In attempting to assign to this, or any similar, system an entropy the author rejects the obvious expression depending upon the mean number of particles. The term "entropy" is, in fact, used in accordance with the conventions of communication theory and not related to any thermodynamical property. An expression for the "correct" entropy is obtained in terms of quantities to be derived from the distribution functions in phase space which need not necessarily correspond to thermal equilibrium. The physical significance of the result is not disclosed.

R. EISENSCHITZ

Moscow State U

USSR/Physics - Quantum statistics entropy FD-2200

Card 1/1 Pub. 146-5/25

Author : Stratonovich, R. L.

Title : Entropy in quantum statistics

Periodical : Zhur; eksp. i teor. fiz. 28, 547-558, May 1955

Abstract : The author considers the states and entropy of quantum-mechanical systems in the case of nonorthogonal realizations of the wave function. He shows that the general formulas lead, on the one hand, to the formulas of classical statistics and, on the other hand, to the well known results of quantum statistics. Four references: e.g. Theory of transmission of electric signals in the presence of noises, collection of translations into Russian, N. A. Zheleznov, editor, Moscow, 1953.

Institution : Moscow State University

Submitted : January 19, 1954; resubmitted after revision February 4, 1955

STRATONOVICH, R. L .

STRATONOVICH, R. L. "The Theory of Correlated Random Points and Its Application to the Calculation of Noise Caused by Electron Currents." Moscow State U imeni M. V. Lomonosov. Moscow, 1956. (Dissertation for Degree of Candidate in Physicomathematical Science)

So: Knizhnaya Letopis', No. 17, 1956.

KUZNETSOV, P.I.; STRATONOVICH, R.L.

Mathematical theory of correlated random points. Izv.AN SSSR.Ser. mat. 20 no.2:167-178 Mr-Ap '56. (MLRA 9:11)

1. Predstavleno akademikom A.N. Kolmogorovym.
(Distribution (Probability theory))
(Correlation (Statistics))

STRATONOVICH, R.L.

PA - 2023

AUTHOR: STRATONOVIC,R.L.
TITLE: On the Distribution in an "Representing" Space.
PERIODICAL: Zhurnal Eksperimental'noi i Teoret.Fiziki, 1956, Vol 31, Nr 6, pp 1012-1020 (U.S.S.R.)
Received: 1 / 1957 Reviewed: 3 / 1957

ABSTRACT: It is assumed that in the quantum theory the state before the trial is described by distribution functions in a "representing" space M, which is of classical significance. "Representing" distributions naturally do not give fully classical interpretation of the quantum theory, but they serve as a basis for an interpretation of quantum-mechanical processes, which is the closest approximation to classical conceptions and is therefore the most illustrative from a physical point of view. The "representing" distribution is defined by the following postulates: The space within which the distribution is defined has classical significance (e.g. phase space or space of directions). The distribution is expressed linearly by the density matrix Q and must be a real function. The statistical averaging of the classical functions A(M) must furnish the same results as the rule for the averaging of the operators $\int A(M)Q(M)dM = TrAQ$. A special case of importance is WIGNER'S distribution in the phase space, which can be derived from the definition of the "representing" distribution by making use of the principles of the homogeneity and equivalence of directions (invariance in the case of translation and

Card 1/3

On the Distribution in a "Representing" Space. PA - 2023

here.
In conclusion the operator moments of the operator function of density are expressed by the operator functions of distribution.

ASSOCIATION: Moscow State University
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress

Card 3/3

STRATONOVICH, P.L.

CARD 1 / 2 PA - 1466

SUBJECT USSR / PHYSICS
AUTHOR STRATONOVIC,P.L.
TITLE The Gauge-Invariant Analogue of WIGNER'S Distribution.
PERIODICAL Dokl.Akad.Nauk, 109, fasc. 1, 72-75 (1956)
Issued: 9 / 1956 reviewed: 11 / 1956

At first the distribution for WIGNER'S distribution is given. This distribution can be used formally also in the case of the existence of an exterior electromagnetic field if the momentum p is characterized not only by the velocity v and the mass m of the particle, but also by the assumption of electromagnetic potentials: $p = P + eA(q)$ at $P = mv$. v and P have a concrete physical significance and are gauge-invariant conceptions, but p is not gauge-invariant. For this reason the distribution $w_2(P,q) = w_1(P + eA,q)$ is used instead of WIGNER'S distribution for gauge-invariant quantities. Also $w_2(P,q)$ should, of course, be gauge-invariant, which is, however, not the case. For the purpose of obtaining a gauge-invariant distribution $w(P,q)$ the basic formula for the distribution must be changed. The determination of an invariant function $w(P,q)$ is equivalent to the determination of an invariant manner of defining the local moments:

$$\langle P_k \ldots P_{k_5} \rangle_q \equiv \int P_{k_1} \ldots P_{k_5} \; w(P,q)\, dP.$$

There follows an examination as to the manner in which the definition of the local moments of momentum p on the occasion of the gauge transformation

STRATONOVICH, R. L.

20-6-12/40

AUTHOR: Stratonovich, R.L.

TITLE: On a Method for the Computation of the Distribution Function Pertaining to the Quantum Theory (Ob odnom metode vychisleniya kvantovykh funktsiy raspredeleniya)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 115, Nr 6, pp. 1097 - 1100 (USSR)

ABSTRACT: The present report deduces relations for the distribution functions and it does it in a form which reminds of the results of the theory of the propagation functions. The author here confines himself to the model of a one-component non-relativistic Bose gas (gaz Boze). Of course the generalization on other cases is also possible. Hamiltons's function (gamil'tonian) is arranged in the following form: $H = \int [\psi^*(x') T_{x'x} \psi(x) + (1/2)\psi^*(x')\Phi(x' - x)\psi^*(x)\psi(x)] dx'dx \equiv \psi^* T\psi + 1/2 n \Phi n$. Here the following abreviations have been applied: $n(x) = \psi^*(x)\psi(x)$; $T = p^2/2m = T_p$, $\Phi(x' - x) = \Phi(x - x')$ denotes the interaction potential. $\psi(x)$ is the secondarily quantized wave function in tridimensional space, which function satisfies the follwoing exchange relations: $[\psi, \psi] = 0$, $[\psi^*, \psi^*] = 0$,

Card 1/3

...form:

...continuous Fourier trans-

...duced to the examination of particles

...s in an exterior fluctuation field. Then the

...examines the deviation conditioned by the interaction

from the ideal values and he introduces functions for the description of this deviation. To each link of the ... diagram with j closed ... and r not closed lines can be assigned. Then these graphs are described more in detail. In these

Card 2/3

On a Method for the Computation of the Distribution Function Pertaining to the Quantum Theory

20-6-12/40

diagrams several interaction lines can emanate from one vertex. There are 1 figure, 5 references, 3 of which are Slavic.

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

PRESENTED: April 10, 1957; by N.N. Bogolyubov, Academician

SUBMITTED: April 9, 1957

AVAILABLE: Library of Congress

Card 3/3

56-6-28/56

AUTHOR STRATONOVICH, R. L.

TITLE On the Statistical Interpretation of the Quantum Theory. (K statisticheskoy interpretatsii kvantovoy teorii.- Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 32, Nr 6, pp 1483-1495 (U.S.S.R.)

ABSTRACT The principles for the classification of operators and the part played by them in statistical interpretation: These principles are here condidered to be the basis of statistical interpretation. Various of such principles of classification are discussed. The most simple principle of classification says that in all products $A_{n_1} A_{n_2} \ldots$ one of the operators always acts sooner or later than the other. (The A_{n_1}, A_{n_2} here denote the operators). To the classification principles discussed here there correspond certain distributions and characteristic functionals, which are here described by means of an index in brackets.
The case of linear equations of motion: The author investigates the distribution types corresponding to the aforementioned classification principles on the basis

CARD 1/2

functions introduced by SCHWINGER for the general case of the existence of exterior sources are nothing but correlation functions. Several equations connected herewith thus find a trivial explanation.

(Russian)

CARD 2/2

Moscow State U.

STRATONOVICH, R. L., LANDA, P. S. (MGU, Moscow)

"The Noise Influence on an Oscillator With Rigid Excitation."

report presented at the All-Union Conference on Statistical Radio Physics, Gor'kiy, 13-18 October 1958. (Izv. vyssh uchev zaved-Radiotekh., vol. 2, No. 1, pp 121-127) COMPLETE card under SIFOROV, V. I.)

AKOPYAN, I.G.; STRATONOVICH, R.L.

Establishment of synchronism in a self-oscillator in the presence of of fluctuation noise. Nauch. dokl. vys. skoly; fiz.-mat. nauki no.1: 162-166 '58. (MIRA 12:3)

1.Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Oscillators, Electron-tube)

AKOPYAN, I.G.; STRATONOVICH, R.L.

Establishment of amplitude in a synchronized self-oscillator in the presence of fluctuation noise. Nauch. dokl. vys. skoly; fiz.-mat. nauki no.1:167-172 '58. (MIRA 12:3)

1.Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Oscillators, Electron-tube)

S/044/61/000/008/018/039
C111/C333

9.2572

AUTHORS: Stratonovich, R. L., Romanovskiy, Yu. M.

TITLE: Parametric influence of a random force on linear and non-linear oscillation systems

PERIODICAL: Referativnyy zhurnal, Matematika, no. 8, 1961, 53, abstract 8B224. ("Nauchn. dokl. vyssh. shkoly. Fiz.-matem. n.", 1958, no. 3, 221-224)

TEXT: The authors consider the behavior of oscillation systems, in the equations of which the coefficient, determining the eigenfrequency, is subject to fluctuations. The authors solve the problem on the basis of the results of Stratonovich (R Zh Mat, 1960, 14227) and of the easymptotic methods of Krylov-Bogolyubov. Linear systems

$$\ddot{y} + 2\delta\dot{y} + \omega^2 [1 + \xi(t)]\, y = 0, \qquad (1)$$

are considered, where $\xi(t)$ is a random function, and the non-linear system

$$\ddot{y} + 2\delta \left[1 + \frac{4}{A_0^2} y^2\right] \dot{y} + \omega^2 [1 + \xi(t)]\, y = 0. \qquad (2)$$

Card 1/2

S/044/61/000/008/018/039
C111/C333

Parametric influence of a random . . .

where A_o is the amplitude of the stationary oscillations As the result of the investigation an inequality is obtained which characterizes the conditions for the excitation of oscillations in system (1) under the influence of a parametric random force. Furthermore, the influence of the nonlinearity in (2) on the growth of the resonance amplitude is investigated.

[Abstracter's note: Complete translation]

Card 2/2

SOV-109-3-4-5/28

AUTHOR: Stratonovich, R. L.

TITLE: Synchronisation of an Oscillator in the Presence of Noise (Sinkhronizatsiya avtogeneratora pri nalichii pomekh)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 4, pp 497-506 (USSR)

ABSTRACT: The presence of noise in a synchronised oscillator leads to: (1) continuous fluctuation of the phase, (2) spurious changes of the phase of the order of $\pi/2$ and, (3) spurious jumps of the phase over a number of periods. The work is mainly concerned with the investigation of the last two effects and the problem is solved by using the Einstein-Focker equation. It is assumed that, if the synchronising voltage is absolutely stable, the operation of the synchronised oscillator can be described by Eq.(1), where $\zeta(t)$ is the fluctuation noise, and z, E and ζ are of the same order. For a tuned-grid oscillator, synchronised by a voltage E', the system equation can be written as Eq.(2) in which the anode current $i_a = \bar{i}_a(U_g) + i_{am}$ consists of

Card 1/4

Synchronisation of an Oscillator in the Presence of Noise

where $\xi(t)$ and $\xi'(t)$ are two similar random functions, having a correlation function $2\lambda^{-1}\delta(\tau)$ where $1/\lambda$ is expressed by Eq.(13). Derivation of Eqs.(12) from Eqs.(7) is done in the appendix on p 504. If Eqs.(12) fulfil the condition expressed by Eqs.(14), the steady state amplitude distribution of the system can be described by Eq.(15), where N_φ is a normalised multiplier. Eq.(14) can approximately be written as Eq.(16). If the system fulfils also the condition expressed by Eq.(17), the phase variation can be described by Eq.(18), from which the steady state phase distribution can be expressed by Eq.(21), where $D = \lambda a^2 \Delta$ and $D_c = \lambda a^2 \Delta_c$. The solution of Eq.(21) is in the form of Eq.(22), where the integration constant N is defined by Eq.(23) or (24). The average frequency deviation of the system can be expressed by Eq.(26). This is used to analyse a number of particular cases, such as $D_c \gg 1$, $\Delta \ll \Delta_c$ and $\Delta_c^2/\Delta^2 - 1 \gg D^{-2/5}$. In the last case the average frequency deviation is represented by Eq.(32). The results are

Synchronisation of an Oscillator in the Presence of Noise.

the regular component $i_a(U_g)$ and the noise component i_{aw}; the grid characteristic of the system is expressed by a polynomial: $i_a(U_g) = i_o + \alpha U_g + \beta U_g^2 - \gamma U_g^3$. Eq.(2) can be transformed into a system of equations representing the amplitude A and the phase variation φ of the oscillator. These are expressed by Eqs.(7), in which the various parameters are defined by Eqs.(3), (4), (5) and (6) and where $\Delta = (\omega_o^2 - \omega^2)/2\omega \approx \omega_o - \omega$ and S_1 and S_2 is the sum of sines and cosines of the multiple angles, having coefficients depending on A and φ .Eqs.(7) can be transformed into

$$\dot{A} = \delta\left(1 - \frac{A^2}{a^2}\right)A + \frac{\omega E}{2}\cos\varphi + \frac{1}{\lambda A} + \xi' \; ; \qquad (12)$$

$$\dot{\varphi} = \Delta - \frac{\omega E}{2A}\sin\varphi + \frac{\xi}{A} \; ;$$

Card 2/4

Synchronisation of an Oscillator in the Presence of Noise

indicated in normalised co-ordinates in Figs.2 and 3. It is also shown that the phase deviation of the system, taken over a time interval t, can be expressed by Eq.(37). There are 3 figures, 4 Soviet references and an Appendix.

ASSOCIATION: Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Physics Department of the Moscow State University, im M. V. Lomonosov)

SUBMITTED: February 21, 1957.

1. Oscillators--Synchronization 2. Oscillators--Properties
3. Mathematics--Applications

~~16(1)~~ 16.6100

AUTHORS: Stratonovich, R.L., Romanovskiy, Yu.M. SOV/155-58-4-27/34

TITLE: ~~A Simultaneous Parametric~~ Influence of an Harmonic and of a Random Force on Oscillation Systems (Odnovremennoye parametricheskoye vozdeystviye garmonicheskoy i slu[illegible]aynoy sily na kolebatel'nyye sistemy)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 4, pp 161 - 170 (USSR)

ABSTRACT: Enlarging the systems considered by the authors in [Ref 1] they investigate the systems

$$\ddot{y} + 2\delta\dot{y} + \omega^2 \left[1 + h \sin \nu t + \xi(t)\right] y = 0$$

where $\xi(t)$ is a stationary random function with mean value zero, while h and ν are constants. Amplitude and phase are sought in the form

$$y(t) = A(t) \cos \phi \quad , \quad \phi = \frac{\nu}{2} t + \varphi(t) \cdot$$

It is assumed that A and φ change slowly which imposes restrictions of the intensity of $\xi(t)$ (as in [Ref 1]). The simplest case, where $\xi(t)$ contains no components of

Card 1/3

A Simultaneous Parametric Influence of an Harmonic and of a Random Force on Oscillation Systems

SOV/155-58-4-27/34

lower frequencies, is explicitly considered. Then for $u = \ln A$ and φ one obtains :

$$\dot{u} = m_1 - \delta + \frac{h\omega}{4} \cos 2\varphi + \xi_1$$

$$\dot{\varphi} = \frac{\Delta}{2} - \frac{h\omega}{4} \sin 2\varphi + \xi_2$$

where the intensities of ξ_1 and ξ_2 are equal to

$$K = \frac{\omega^2}{8} \mathcal{H}(2\omega)$$

($\mathcal{H}(2\omega)$ is half the spectral density for the frequency 2ω),

$\Delta = 2\omega - \nu$, $m_1 = \frac{\omega^2}{8} \mathcal{H}(2\omega)$.

Then conditions for parametric excitation are obtained and the boundaries of the domain of instability depending on the parameters of the system are determined.

Card 2/3

A Simultaneous Parametric Influence of an Harmonic and SOV/155-58-4-27/34
of a Random Force on Oscillation Systems

The authors thank Professor S.P. Strelkov and D.P. Kostomarov for their assistance.

There are 2 figures, and 3 Soviet references.

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

SUBMITTED: February 21, 1958

Card 3/3

1

06333
SOV/141-2-1-5/19

AUTHORS: Stratonovich, R.L. and Landa, P.S.

TITLE: The Effect of Noise on an Oscillator with Hard Excitation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 1, pp 37 - 44 (USSR)

ABSTRACT: The growth process in an oscillator with soft excitation has already been studied (Refs 1, 2); a linear approximation, valid at small amplitudes, was used. With hard excitation the situation is more complex since the presence of noise may either encourage or inhibit oscillations and a more sophisticated approach is needed. The problem is of interest in closed-loop control systems (which are potential oscillators) and the case examined here is such a second-order circuit. In the presence of noise and an external harmonic signal, it is described by Eq (1). If it may be assumed that the correlation time of the noise is much less than the relaxation time of the system - if Eq (1) is converted into phase-plane coordinates and the noise has zero mean spectral density then the corresponding Fokker-Plank equation is Eq (4). Introducing the potential function at the top of p 39, allowing for the

Card1/3

The Effect of Noise on an Oscillator with Hard Excitation

order of smallness of noise and external signal, there are 2 regions of greatest probability in the phase-plane corresponding to 2 stable states of the oscillator: unexcited and excited. Between these 2 regions lies another, of low probability, representing an unstable condition. Figure 1 shows the phase plane, the shaded area S_1 is for the 'unexcited' and S_2 for the 'excited' states. The expressions for the curves Γ_1 and Γ_2 are at the foot of p 39 and head of p 40, respectively. The probabilities of the unexcited and excited states are Eqs (8) and (9), respectively. These can be found as time functions by solving the Fokker-Plank equation. In an oscillator with hand excitation, the presence of noise means that both growth and decay processes exist simultaneously. The probability of the state-point being at any particular place is conveniently thought of as the result of two counter-flows of probability between the regions. The probability that the oscillator will remain unexcited if originally so

The Effect of Noise on an Oscillator with Hard Excitation

is Eq (20) and the probability that oscillations will cease is Eq (21). These expressions evidently depend on k_{10} and k_{20}, as defined in Eqs (24) and (25), when there is no external signal and Eqs (26) and (27) when there is. In the former case, the potential function is Figure 2. Figures 3 and 4 show the mean frequency of change of state as a result of noise. The oscillator is more often excited than otherwise. S.P. Strelkov is thanked for assistance.
There are 4 figures and 4 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)
SUBMITTED: May 24, 1958

80126

S/141/59/002/06/007/024
E192/E382

6.9000

AUTHOR: Stratonovich, R.L.

TITLE: Optimum, Non-linear Systems Permitting the Separation of the Signal Having Constant Parameters from Noise

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 6, pp 892 - 901 (USSR)

ABSTRACT: The mathematics of the Markov processes are employed to determine the a posteriori distribution of the parameters of the useful signal when the signal is received together with non-Gaussian noise. The following procedure is adopted. A probability functional $W[\xi(t)]$ of a random process $\xi(t)$ is an expression depending on $\xi(t)$ which, with an accuracy up to a constant multiplier, characterizes the probability of a given realization of the process. The probability functional can be obtained by a simultaneous consideration of the distribution of the random quantities $\xi(t_1)$, ... $\xi(t_N)$. If $\xi(t)$ is the delta-correlated normal noise whose correlation function is given by:

$$\overline{\xi(t)\xi(t')} = K\delta(t - t') \qquad (1),$$

Card1/4

Optimum Non-linear Systems Permitting the Separation of the Signal Having Constant Parameters from Noise

its probability functional is expressed by Eq (5), where T is the chosen time interval. For the case of a noise $n(t)$ which is in the form of a Markov process such that it satisfies Eq (6), where $\xi(t)$ is the normal noise, the probability density distribution obeys Eq (7). For small intervals Δ the probability density can be expressed by Eq (8). The probability functional is in the form of:

$$W[n(t)] = \exp\left\{ -\frac{1}{K}\left[U(n_T) + U(n_o)\right] - \right. \qquad (21) \cdot$$

$$\left. -\frac{1}{2K}\int_0^T \left[\dot{n}^2 + f^2(n)\right] dt - \frac{1}{2}\int_0^T f'(n)dt \right\}$$

If the form of the received signal is known, it is possible by employing the expression for the probability functional

Card2/4

Optimum Non-linear Systems Permitting the Separation of the Signal Having Constant Parameters from Noise

to determine the a posteriori distribution of the parameters of the signal. For this purpose it is necessary to employ the principle of inverse probability. It is shown that the conditional or the a posteriori distribution of the parameters is expressed by Eq (25), where the constant C is independent of $x_1, \ldots, x_m$. In order to obtain the equation for optimum filtration it is necessary to investigate the change of the a posteriori distribution when the observation time is increased. It is shown that if the observation time T is increased by dT the change in the a posteriori density distribution can be found from Eq (27). By introducing the notation defined by Eq (28), it is possible to write Eq (27) in the form of Eq (29). The above differential equation for the optimum filtration is employed to investigate the case when the useful signal is represented by an unknown constant value. During a time T a signal $r(t) = s + n(t)$ is received; n(t) represents a generalized Markov process. On the basis of

Card3/4

80126

S/141/59/002/06/007/024
E192/E382

Optimum Non-linear Systems Permitting the Separation of the Signal Having Constant Parameters from Noise

Eqs (28) and (21), the following expression is obtained:

$$F(r - s) = -\frac{1}{2K}\left[\dot{r} - f(r - s)\right]^2 - \frac{1}{2} f'(r - s) \qquad (36).$$

The expression for the optimum filtration is in the form of Eqs (37). It is seen that Eqs (37) are non-linear. In a particular case when $f(n)$ is a linear function, Eqs (37) become linear. If it is assumed that $f(n) = \beta - n$, Eqs (37) can be written as Eqs (41). There are 7 references, 2 of which are English and 5 Soviet; 2 of the Soviet references are translated from English.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: December 29, 1958

Card 4/4

83937
S/188/60/000/004/014/014
B005/B060

6.9412

AUTHOR: Stratonovich, R. L.

TITLE: The Paradox in the Theory of Thermal Fluctuations of Nonlinear Resistors

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 3, fizika, astronomiya, 1960, No. 4, pp. 99-102

TEXT: Internal thermal fluctuations giving rise to constant, nonvanishing mean values of potentials and currents apparently arise in nonlinear resistors with asymmetric conductivity. This phenomenon would contradict the second principle of thermodynamics. The author of the present paper bases on the analysis of a dynamic model of a nonlinear resistor to prove that there occurs a shift in the characteristics of the nonlinear element, and that the probability distribution for the potential at the capacitance coincides with the distribution corresponding in the case of a linear resistor. When it is assumed that every electron of a nonlinear resistor moves about in a given potential

Card 1/3

The Paradox in the Theory of Thermal Fluctuations of Nonlinear Resistors

field independently of other electrons, and that there is a Boltzmann distribution of electrons in the metal, the following equation results for the mean current strengths from left to right ($\bar{I}_+$) and from right to left ($\bar{I}_-$): $\bar{I}_+ = \bar{I}_- = en_0 \exp(-eV_c/kT)$, where e denotes the elementary charge and V_c is the electrode potential. If there is a potential difference V between the resistor contacts, the following holds for the individual partial current strengths: $\bar{I}_+ = en_0 \exp(-eV_1/kT)$; $\bar{I}_- = en_0 \exp(-eV_2/kT)$ (1). Here, V_1 and V_2 are the differences between the extreme potential values of the potential barrier between the electrodes, which the electrons have to surmount, and the electrode potentials. The paradox which arises in connection with thermal fluctuation is eliminated by taking acccunt of the fact that the potential difference V does not remain constant during the motion of an electron, however short its duration. The author derived the kinetic equation for the probability density, which describes the fluctuation process in the model considered. The steady-state solution of this

Card 2/3

The Paradox in the Theory of Thermal Fluctuations of Nonlinear Resistors

equation shown here indicates the probability distribution $w(V)$: $w(V) = (C/2\pi kT)^{1/2} \cdot \exp(-CV^2/2kT)$ (C being the capacity). This result fits the distribution in the case of a linear resistor. The author shows that it is not enough to know the characteristic $\bar{I}(V) = \bar{I}_+ - \bar{I}_-$ for setting up the said kinetic equation nor for a complete statistical interpretation of the process, but that also the individual components $\bar{I}_+(V)$ and $\bar{I}_-(V)$ as well as the value of the elementary jump e/C must be known. For the special case of the nonlinear characteristic being symmetrical, the given kinetic equation assumes a simpler form which is likewise shown and which the author had previously obtained by another way for the case of symmetrical mechanical nonlinear friction. This equation has, therefore, in this context a general validity for physical Markov processes. The author finally thanks V. I. Shmal'gauzen, who helped solving the paradox with his suggestions. Gratitude is further expressed to the heads of the seminars and their participants, Professor S. P. Strelkov, Professor S. D. Gvozdover, Professor V. V. Migulin, and A. Marek for their useful discussions. There are 4 non-Soviet references.

Card 3/3 Moscow State U., Chr. Gen Physics for Math. - Mechanics

KUZNETSOV, P. I.; STRATONOVICH, R.L.; TIKHONOV, V.I. (Moskva)

Quasi-moment functions in the theory of random processess. Teor. veroiát. i ee prim. 5 no.1:84-102 '60. (MIRA 13:10)
(Probabilities)

STRATONOVICH, R.L. (Moscow)

Conditional Markov processes. Teor. veroiat. i ee prim. 5 no.2:172-195 '60. (MIRA 13:9)
(Probabilities)

88153
S/109/60/005/011/001/014
E140/E485

6.7000 (also 1009)

AUTHOR: Stratonovich, R.L.

TITLE: The Theory of Markov Processes Applied to Optimal Signal Filtering

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.11, pp.1751-1763

TEXT: For Gaussian signal and noise and a criterion of minimum mean-square error, the optimal detector is linear and can be calculated by the Kolmogorov-Wiener theory (Ref.1,2). With non-Gaussian signal or noise the optimal transformation is nonlinear. A special case has been solved by Woodward and Davies (Ref.3) using the method of inverse probability. For complicated cases this method encounters substantial computational difficulty. In such cases the theory of Markov processes has been applied by the author (Ref.4,5). Markov processes can be continuous or discontinuous, unicomponent or multicomponent, correspond to continuous time or discrete sequences. Here the author investigates the detection of a signal with time-variable parameters in non-Gaussian noise, which is assumed to be delta-correlated.

Card 1/ 4

88153
S/109/60/005/011/001/014
E140/E485

The Theory of Markov Processes Applied to Optimal Signal Filtering

To point up the advantages of the method over that of Woodward and Davies, the author first considers the case of the useful signal constituting a rectangular pulse of known amplitude and duration, whose time is to be determined. The noise is assumed to be white noise. The formula derived by the method of inverse probabilities leads to certain difficulties where the pulse positions in different repetition periods are a priori independent or when the successive positions are correlated but the rate of change of position is very high. Then the properties of the Markov processes are useful for determining the a posteriori probability density. For the pulse positions to form a Markov chain, it is necessary that the conditional distribution for x_{k+1} depend only on x_k and not on $x_{k-1}, x_{k-2}, \ldots$ If the latter dependencies are also taken into account a complex Markov process is obtained, which can also be handled by the method presented in the article. In general, a real process can be represented as constituting a multi-dimensional Markov process to any prescribed precision. The complexity of the process increases with increase of precision. Further, the author considers only the simple Markov process. The author

Card 2/4

S/109/60/005/011/001/014
E140/E485

The Theory of Markov Processes Applied to Optimal Signal Filtering

derives easily

Eq. (8)
$$w_{k+1}(x_{k+1}) = C \exp\left\{\frac{1}{N}\int_{kT}^{kT+T} y(t)\, s_0(t - kT - x_{k+1})\, dt\right\} \int w_T(x_{k+1} - x_k) \times w_k(x_k)\, dx_k. \quad (8)$$

where t is the current, T is the length of period, x is the coordinate and w the probability density. A computer to realize the transformations given in Eq.(8) will be an optimal nonlinear detector of the input signal y(t). It can be realized by the system given in the figure, where БВ is the Woodward-Davies unit, БУ is a muitiplier unit, У is an amplifier, БЗ is a delay unit, БИ is a unit for realizing convolution. Further, the author considers a system for detecting the phase of a narrow-band signal in white noise. Examining the differential equations of optimal filtration, the author shows that the theory leads to an

Card 3/4

S/109/60/005/011/001/014
E140/E483

The Theory of Markov Processes Applied to Optimal Signal Filtering

infinite system of equations, i.e. a system which is not physically realizable. An analysis is given of the effects of modelling the first few equations and breaking off the system at a given point. Finally, the question of a Gaussian approximation to a non-Gaussian process is considered. There are 1 figure and 6 references: 4 Soviet and 2 non-Soviet.

ASSOCIATION: Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova (Physics Division, Moscow State University imeni M.V.Lomonosov)

SUBMITTED: December 24, 1959

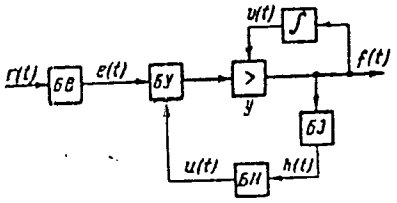


Fig.

Card 4/4

STRATONOVICH, R.L.

Paradox in the theory of thermal fluctuations in nonlinear resistances. Vest.Mosk.un.Ser.3:Fiz.,astron. 15 no.4:99-102 Jl-Ag '60. (MIRA 13:9)

1. Kafedra obshchey fiziki dlya mekhmata Moskovskogo universiteta.
(Electric resistors--Thermal properties)

STRATONOVICH, R.L.

Theory of nonequilibrium statistical processes. Zhur.eksp.i teor.fiz. 38 no.3:825-833 Mr '60. (MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet.
(Probabilities) (Motion)