MARKOV, A. A.

3478. Impulsive potential on a resistive and capacitive load. A. A. MARKOV. *Zh. tekh. Fiz.*, 23, *No.* 11, 2071-7 (1953) In Russian.

A series of general observations are made on the form and amplitude of the potential across a parallel resistance-capacitance combination for various impulse currents. These observations are shown to apply for a similar RC network whose circuit is given. The potential is examined for exponential current impulses and curves are given showing variation of amplitude with resistance for several forms of this impulse. V. V. ZAKHAROV

MARKOV, A.A.

621.373,43 : 621.3.018.75

4716. **The nature of the influence of loading on the form of a voltage impulse.** A. A. MARKOV. *Zh. ėksper. teor. Fiz.*, 24, *No.* 2, 214[redacted]

The source is a generator of unit-function constant current. The load circuits are either a parallel-connected resistor and capacitor or circuits which are reducible to this form. The operational solution of the network equations is explained, and it is shown that the effect of a series capacitor between the source and load is to lengthen the voltage pulse in comparison with the current pulse. S. C. DUNN

B7

MARKOV A. A.

1 - pmt

19 3

Measurement of the lifetime of π^+ mesons. M. S. Kozodaev, A. A. Markov, and A. A. Tyapkin. *Bull. Acad. Sci. U.S.S.R., Phys. Ser.* 6, 647-51(1955)(English translation).—See *C.A.* 50, 7018a. B. M. R.

Nucl Sci

pmt

MARKOV, A.A.

Type GIM-4 pulse generator. Sbor.nauch.rab. MIFI no.9:135-144 '55.
(MIRA 10:1)

(Pulse techniques (Electronics))

GAYDAYEV, G.L.; MARKOV, A.A.; TSAREGORODTSEV, M.N.

Device for recording out-of-phase (inhibited) coincidences. Sbor. nauch. rab. MIFI no.9:145-154 '55. (MIRA 10:1)
(Pulse techniques (Electronics))

Markov, A.A.

Formation of neutral mesons by high-energy nucleons. M. S. Kozodaev, A. A. Tyapkin, Yu. D. Bayukov, A. A. Markov, and Yu. D. Prokoshkin. *Bull. Acad. Sci. U.S.S.R.* 19, 620-33(1955)(Engl. translation).--See *C.A.* 50, 7010c. B. M. R. 5

KOZODAYEV, M.S.; TYAPKIN, A.A.; BAYUKOV, Yu.D.; MARKOV, A.A.; PROKOSHKIN, Yu.D.

Production of neutral mesons by high-energy nucleons. Izv.AN SSSR. Ser. fiz.19 no.5:589-603 S-O '55. (MLRA 9:4)

1.Institut yadernykh problem Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

KOZODAYEV, M.S.; MARKOV, A.A.; TYAPKIN, A.A.

Measuring π^{+}-meson lifetime. Izv.AN SSSR.Ser.fiz.19 no.6: 715-719 N-D '55. (MLRA 9:4)

1.Institut yadernykh problem Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

Марков, А. А.

USSR.

3431 AEC-tr-2179
HYPERONS AS EXCITED STATES OF NUCLEONS. A POSSIBLE MECHANISM OF MULTIPLE FORMATION OF PARTICLES. A. A. Markov. Translated from Doklady Akad. Nauk S.S.S.R. 101, 440-52(1955). 6p.

MARKOV, A. A.

"Inversion of Complicated Systems of Functions."

report presented at All-Union Conference in Problems in the Theory of Relay Devices, Inst. for Automation and Remote Control AN USSR, 3-9 Oct 1957.
Vestnik AN SSSR, 1958, No. 1, v. 28, pp. 131-132. (author Ostianu, V. M.)

MARKOV, A. A.

"Errors in Calculations of Pulsating Irradiation," paper presented at the 4th International Electronics and Nuclear Energy Exhibition and Conference in Rome, ~~Itali~~ Italy, 22 Jun-6 Jul 1957

B-3,090,612, 25 Oct 57

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032420014-4"

AUTHOR: [illegible], A.A.

TITLE: [illegible]

$$\delta = (. - ')/n \simeq [illegible]$$

[illegible]

Card 1/[illegible]

[illegible]

SUBMITTED: [illegible]

AVAILABLE: Library of Congress.

2/2 1. Pulse counters-Errors 2. Mathematical-Theory

SOV-120-[illegible]

AUTHORS: Markov, A. A. and Sofiyev, G. N.

TITLE: What Should be the Design of a Mass-Produced Pulse [illegible] for Work with Amplitude Analysers (Kakim [illegible] seriynyy generator impul'sov dlya raboty s amplitudnymi analizatorami)

PERIODICAL: Pribory i Tekhnika Eksperimenta [illegible] (USSR)

ABSTRACT: A specification is given for a generator suitable for work with amplitude analysers. The specification [illegible] of 31 items and a block diagram (Fig.1). There is 1 figure, no tables and no references.

SUBMITTED: September [illegible], 1957.

1. Pulse generators--Design 2. Pulse generators--Specifications

Card 1/1

SOV/120-58-6-4/32

AUTHORS: Bayukov, Yu. D., Kozodayev, M. S., Markov, A. A., Sinayev, A. N., Tyapkin, A. A.

TITLE: A Multichannel Pair γ-Spectrometer. I. Calculation of the Main Characteristics of the γ-Spectrometer (Mnogokanal nyy parnyy gamma-spektrometr. I Raschet osnovnykh kharakteristik-gamma-spektrometra)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, pp 23-29 (USSR)

ABSTRACT: In a pair γ-spectrometer the energy of the quanta is determined by measuring the total energy of the components of the electron positron pair formed in a thin converter. The first 2-channel pair spectrometer was built by Dzhelepov (Ref 1). Later spectrometers built on this principle were widely used in measuring the spectra of hard γ-rays (Refs 2 to 8). The electron and the positron leaving the converter were deflected by a magnetic field in different directions and for certain values of their energy they enter ionisation counters connected in coincidence. For a given intensity of the magnetic field and a fixed position of the counters such a spectrometer will record a fraction of the pairs produced by γ-rays in a given energy range. In a simple 2-channel spectrometer in which one channel records the electrons and

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SOV/120-58-6-4/32

A Multichannel Pair γ-spectrometer. I. Calculation of the Main Characteristics of the γ-spectrometer

the other the positrons, an increase in the accuracy of measurement is associated with a marked decrease in the efficiency. Good energy resolution and high efficiency can only be simultaneously achieved in a multichannel spe[illegible] meter. In such a spectrometer the efficiency may be increased by a factor [illegible] n_2 without loss of resolution, where [illegible] n_2 are the numbers of electron and positron counters [illegible] such a spectrometer several energy intervals may be [illegible] at the same time. A number of such multichannel spect[illegible] meters have been described (Refs.5, 6 and 8). The c[illegible] of a γ-spectrometer as a measuring instrument is [illegible] by its efficiency and spectral sensitivity. In [illegible] multichannel system it is necessary to take into a[illegible] characteristics for the various pairs of channels of the spectrum. In this connection, a discussion is given in the present paper of the dependence of the efficiency and spectral sensitivity of the separate pairs of channels on variou[illegible]

Card 2/6

A Multichannel Pair γ-spectrometer. I. Calculation of the Main Characteristics of the γ-spectrometer

parameters of the spectrometer:
1) Spectral sensitivity: the basic diagram of a γ-spectrometer considered in this paper is shown in Fig.1, in which the meanings of the symbols employed are indicated. In view of the finite width of the counters, the spectrometer records γ-quanta in a certain energy interval from $E_{\gamma\ min}$ to $E_{\gamma\ max}$. The corresponding spectral sensitivity curve is then shown in Fig.2a and is of triangular form with a dispersion given by

$$\sigma_{1}^{2} = 1/6\ \ell_c^2/(r_1 + r_2)^2$$ where ℓ_c is the width of a counter and r_1 and r_2 are the distances from the converter to the centres of the counters, respectively. The effect of the width of the converter upon the spectral sensitivity is examined and it is shown that a converter of a finite width introduces a spread into the spectral line in the high energy region of γ-quanta. As the angle φ between the direction of motion of the γ-quanta and the straight line connecting the centre of the converter with

SOV/120-58-6-4/32

A Multichannel Pair γ-spectrometer. I. Calculation of the Main Characteristics of the γ-spectrometer

the counter increases, the spread of the spectral line decreases. At $\varphi = 90^{\circ}$ the width of the spectral sensitivity curve is independent of the converter width. The effect of the converter width gives a distribution of the form shown in Fig.2b, which has a dispersion given by:

$$\sigma_2^2 = \frac{\ell_k^4 \mathrm{ctg}^4 \varphi}{180 r_1^2 \cdot r_2^2}$$

. The effect of multi... scattering in the converter is estimated and expre... are derived for this effect also. Finally, an estima... given for the radiation loss experienced by the electron-positron pair on traversing the converter.

2) Efficiency: in this section the Bethe-Heitler expression for the probability of formation of a pair by a γ-quantum of

Card 4/6

SOV/120-58-6-4/32

A Multichannel Pair γ-spectrometer. 1. Calculation of the Main Characteristics of the γ-spectrometer

energy E_γ is used (Ref.13) with a modification described by Bethe et al in Ref.22.

3) Multichannel system: in a multichannel spectrometer the electrons and positrons formed by γ-quanta of a given energy are recorded by a number of combinations of pairs of counters. The electronic circuit of such a spectrometer should record coincidences between pulses from each electron counter with pulses from any positron counter. Thus, any combination of one electron counter and one positron counter is, in fact, a 2-channel spectrometer. For a given geometry a spectrometer containing n channels records γ-quanta in n-1 energy intervals of different mean energy. In practice, one seeks to find the form of the spectrum and the absolute intensity in one of the energy intervals. To find the form of the spectrum it is sufficient to know the relative efficiency of recording for the different energy intervals, and this is given by Eq.(10). In order to obtain the absolute intensity in one of the energy intervals it is necessary to know the total absolute efficiency of recording of γ-quanta in one of the energy intervals. This problem is not treated.

Card 5/6

SOV/120-58-6-4/32

A Multichannel Pair γ-spectrometer. I. Calculation of the Main Characteristics of the γ-spectrometer

V. V. Mel'nikov is thanked for carrying out a number of calculations. There are 2 figures and 22 references of which 4 are Soviet, 1 German, 1 Soviet translated from English and the rest are English.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Studies)

SUBMITTED: December 27, 1957

Card 6/6

SOV/120-58-6-5/32

AUTHORS: Bayukov, Yu. D., Kozodayev, M. S., Markov, A. A. Sinayev A
Tyapkin, A. A.

TITLE: A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel Spectrometer (Mnogokanal'nyy parnyy gamma-spektrometr. II. Opisaniye dvenadtsatikanal'nogo spektrometra)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, pp 30-40 (USSR)

ABSTRACT: Application of a multichannel pair spectrometer in synchr cyclotron work presents a number of specific requirements as far as counters of the ionising particles and the electronic system of the spectrometer are concerned. Since the beam intensity is high and consists of short pulses of 200 to 300 μs each at a repetition frequency of 40 to 80 pulses per sec, it follows that the apparatus must be very fast. It is desirable that the input blocks should have resolving times not greater than 1 μs. The large background intensity in synchro-cyclotron work means that it is always necessary to use a special selection system which records only electron-positron pairs. For this reason, in the spectrometer each component of a pair should be recorded by a number of counte in coincidence with sufficiently low resolving time. The
Card 1/7 present paper describes a 12-channel γ-spectrometer which has

been used over a number of years in studying the spectra of hard γ-rays and neutral π-meson decays (Refs.2-6). The first variant of the spectrometer was built in 194?. In 195? and 1954 the spectrometer was modified to improve its charac-teristics. The spectrometer described here satisfies com-pletely the above requirements and is based on the design calculations given in the previous paper (Ref.1) in this issue.

1) Magnetic system and geometry of the instrument

The magnetic field is produced by an SP-56 electromagnet. Fig.1 shows the disposition of the counters for two ty... demountable pole pieces. The gap between the poles ... and the maximum field in the gap is 18 000 oersted ... electromagnet current is stabilised to 0.1%. In studies of γ-ray spectra in the energy region 20 to 200 MeV, $2\varphi = 180^\circ$ (Fig.1b) and in the energy region 100 to 450 MeV, $2\varphi = 90^\circ$ (Fig.1a). In the former case semi-circular focussing of

SOV/120-58-6-5/32

A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel Spectrometer

electrons and positrons was used, and this led to increased efficiency (Ref.1) because it was possible to use wider and thicker converters. For γ-quqnta in the energy range 450-600 MeV, $2\varphi = 90^{\circ}$ but the counters were at a larger distance from the converter. Copper converters were used (0.1, 0.3 and 0.5 mm, depending on the energy).

2) Resolving power and efficiency.

Fig.2 shows curves of the total spectral sensitivity for the 7th energy interval for various values of $E_{\gamma 0}$ and thicknesses T_k of the copper converters. These curves are based on the theoretical data given in the previous paper and are obtained by a statistical combination of the partial distributions due to a) width of the counters, b) width of the converter, c) multiple scattering and d) radiation. As can be seen, the form of the total spectral sensitivity curve is very nearly triangular, which means that the total spectral sensitivity is governed mainly by the width of the channels ℓ_c (see Fig.1 of previous paper, p 24, this issue).

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A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel Spectrometer

3) Counters and selection system. The counters used were proportional counters having a cylindrical stainless steel cathode, 10 mm in diameter and a molybdenum filament 0.1 mm in diameter. They were filled with $(CH_2(OCH_3)_2)$ at a pressure of 160 to 200 mm. The working voltage was 1600 to 2000 V. The counters have an effective dead time not exceeding 10^{-7} sec. The efficiency of the counters for particles with relativistic ionisation reaches 98% in a coincidence scheme with a resolving time of 5×10^{-7} sec. The delay of the pulses due to drift of electrons through the counter gas is less than 10^{-7}. The counters give electrical pulses with amplitudes between 10^{-4} and 1 V. The large difference in the amplitudes requires the use of amplifiers having a wide dynamic range and an amplification of a few thousands. 6-fold coincidences were used and the number of random coincidences in each 6-fold channel was 0.02 pulses per sec. The number of electron-positron pairs recorded per

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A Multichannel Pair γ-Spectrometer. II. Description f a 12-channel Spectrometer

sec depended on the efficiency of the spectrometer with respect to the γ-quanta in the measured energy interval and the form of the spectrum and was in the range 0.1 to 10 pair per sec.

4) Electronic scheme.

A block diagram of the electronic part of the spectrometer i shown in Fig.3. The left-hand portion of this diagram shows 6 co-ordinate counters of the electron series (a_1 - a_6), 6 co-ordinate counters of the positron series (Ƃ$_1$ - Ƃ$_6$) and 4 selection counters (A', A", Ƃ' and Ƃ"). Each of these counters in practice consists of a group of counters whose filaments are connected. A recorded electron or positron should pass through 3 counters (1 co-ordinate and 2 selectic counters). A pair is recorded if a 6-fold coincidence take place. Negative-going pulses from each counter are amplified by a corresponding amplifier-converter (Fig.4). These amplifiers have a rise time of 2 x 10^{-4} sec. Pulses from all the 16 amplifier-converters are applied to the main bloc which is at a distance of 1.5 m from the amplifier-converte (Fig.5). Pulses from the selection counters are applied to

SOV/120-58-6-5/32

A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel Spectrometer

4-fold coincidence scheme while pulses from the co-ordinate counters are applied to mixers and in addition through delay lines to a hodoscopic system consisting of 2-fold coincidenc circuits and output univibrators. The pulse at the output of a mixer appears in the presence of a pulse in at least on of the co-ordinate counters of a given series. Pulses from both the mixers and also from the 4-fold coincidence scheme are applied to a 3-fold coincidence scheme which produces th final output pulse. It follows that the latter pulse appear when a 6-fold coincidence takes place, i.e. when a particle passes through at least one of the co-ordinate counters in the electron series, through one of the co-ordinate counters of the positron series, and all the counters of the selectio system. The resolving time of the above coincidence schemes is 5×10^{-7}.

5) Method of measurement and treatment of results.

Fig.7 shows the experimental arrangement. In this figure 1 is the proton trajectory, 2 is the target, 3 is the synchro-cyclotron chamber, 4 is a concrete wall, 5 is a collimator.

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SOV/120-58-6-5/32

A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel Spectrometer

6 is a diaphragm, 7 is a clearing magnet which removes e.ectrons and positrons from the beam, 8 is an additional screen, 9 is the convertor and 10 is the spectrometer electro magnet. Fig.8 shows a typical result obtained for the energy spectrum of γ-quanta from neutral π-meson decays. The mesons were produced by 660 MeV protons at a carbon targe The spectra are measured at an angle of 180-0° to the direction of motion of the protons. G.P.Zorin, B.A.Krasnovidov, L. A.Fadeyev and G.N.Stepanov are thanked for their assistance. There are 8 figures, 4 tables and 7 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Studies)

SUBMITTED: December 27, 1957.

SOV/120-59-1-38/50

AUTHOR: Markov, A. A.

TITLE: A Method for the Measurement of the Ratio of Pulse Heights (Metod izmereniya otnosheniya amplitud impul'sov)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, p 158 (USSR)

ABSTRACT: In experimental nuclear physics it is sometimes necessary to measure the ratio of pulse heights of coincident pulses. This problem may be solved by means of the apparatus shown diagrammatically in Fig 1. Short pulses whose heights are u_a and u_b are applied to the two inputs and the condensers C_a and C_b are charged to roughly the same values through the two diodes and then begin to discharge through R_a and R_b. Assuming that R_aC_a and R_bC_b are both equal to say RC and that the latter time constant is much greater than the pulse length one finds that the voltages across the condensers will fall off exponentially with a time constant equal to RC. These voltages are applied to two pulse height discriminators with the same threshold E. The voltages across the condensers will be equal to the threshold voltage at different times

Card 1/3

t_a and t_b so that

$$E = u_a \exp\left(-\frac{t_a}{RC}\right) = u_б \exp\left(-\frac{t_б}{RC}\right)$$

This is illustrated in Fig 2. The difference between the times when the voltages are across the two condensers become equal to the threshold of the discriminators is then given by

$$t_a - t_б = RC \log(u_a/u_б) \quad .$$

It follows that the logarithm of the ratio of the pulse heights is proportional to the time difference and thus may be determined using one of the well-known time interval analyzers. The method was suggested in 1956 and was reported

SOV/120-59-1-38/50

A Method for the Measurement of the Ratio of Pulse Heights

at the All-Union Conference on Analyzers in 1957. There are 2 figures.

SUBMITTED: January 31, 1958.

Card 3/3

24 (4), 21 (8) SOV/20-125-6-11/61

AUTHORS: Vasil'yev, G. Ya., Usatiy, A. F., Lazurkin, Yu. S., Markov, A. A.

TITLE: Measurement of the Luminescence and Darkening of Glass During the Process of Their Irradiation in a Nuclear Reactor (Izmereniye lyuminestsentsii i potemneniya stekol v protsesse ikh liucheniya v yadernom reaktore)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 6, pp 1219-1222 (USSR)

ABSTRACT: The present paper is intended to work out the construction of device for the simultaneous measurement of the luminescence and darkening of transparent materials in a nuclear reactor and to deal with the carrying out of experiments by means of this apparatus. The usefulness of parallel measurements of the yield of the luminescence and of the darkening of the sample may be seen from the close connection between these phenomena during irradiation. The device consists of an aluminum tube of 5 m length and 60 mm diameter, inside of which two tubes of the darkening tract (polished inside) and one polished tube of the luminescence tract were fitted. Further details of the apparatus are described. Luminescence

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and darkening were measured in the perpendicular, dry, channel of 65 mm (with external water-cooling) of the experimental reactor VVR. In this reactor ordinary water is used as moderator and coolant. The channel was near the active zone of the reactor. By variation of the power of the reactor various values are obtained for the differential dose. In the case of all experiments temperature remained below 35°. The samples consisted of 10 mm thick disks with a diameter of 20 mm. The following quantities were measured by remote control: a) the brightness of luminescence and its time dependence at various differential doses. b) The darkening of the samples and their time dependence at various differential doses c) Measurement of darkening after irradiation was stopped. Measurements were carried out on various types of quartz, pyrex glass, cerium glass, polymethylmethacrylate, and polystyrene. In the case of all quartz samples, the relation $B = \beta P$ holds up to a differential dose of $P = 2000$ rad/sec, where β denotes the specific brightness coefficient of luminescence. In the case of polymethylmethacrylate and polystyrene the brightness of luminescence increases with progressin time and increasing integral dose. The optical density D for some dozens of minutes remains on the equilibrium level, the amount of which depends on the differential dose, and changes only little with an increase of the integral dose. The measurements carried out in the course of this investigation are only the first part of a series of measurements which is planned. There are 3 figures and 2 Soviet references

PRESENTED: January 8, 1959, by A. P. Aleksandrov, Academician

SUBMITTED: September 23, 1958

MARKOV, A. A., DYAKOV Yu. Ye., SAKALYAN, K., and SHEBESHTEN, B.

"Impulse Scaling Circuit Using new System with Multiple Equilibrium States"

Joint Institute of Nuclear Reseach, Dubna, USSR.

report submitted for the IAEA conf. on Nuclear Electronics. Belgrade, Yugoslavia 15-20 May 1961

S/120/62/000/003/004/048
E032/E114

AUTHOR: Markov, A.A.

TITLE: Difference measurements in multichannel spectrometers

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 30-35

TEXT: It is pointed out that low-intensity photopeaks at low energies may become masked by the Compton distributions belonging to higher energy photopeaks. Such photopeaks can be separated by subtracting from the overall spectrum the high-energy components. The present author gives a general description of a procedure whereby this may be done (semi-automatically) in practice. Thus, once the main peaks in the spectrum under investigation have been identified, pure sources are introduced in place of the specimen under investigation and their spectra subtracted from the original spectrum. Background and statistical errors must be taken into account in such procedures and the author gives a general analysis of them. The discussion is concerned both with amplitude analysers and time selectors. No experimental results are reported.

SUBMITTED: June 15, 1961

Card 1/1

S/120/62/000/006/019/029
E140/E435

AUTHORS: Levin, G.L., Markov, A.A., Plakhov, A.G., Smolkin, G.Y Sofiyev, G.N., Stepanov, G.N., Shapkin, V.V.

TITLE: Line and frame scanning generator for electron-optical image intensifiers

PERIODICAL: Pribory i tekhnika eksperimenta, no.6, 1962, 100-106

TEXT: The authors discuss the use of image-intensifier tubes for the spectroscopic and space-geometric study of pulsed gas discharges in plasma studies (controlled thermonuclear synthesis). The system permits spectral analysis of dynamic processes with time resolution in the range 5×10^{-8} to 1.25×10^{-5} sec. A five-stage intensifier is used. Free-running and triggered versions are used, the latter to reduce background noise where necessary. There are 6 figures.

ASSOCIATION: Institut atomnoy energii AN SSSR (Institute of Atomic Energy AS USSR)

SUBMITTED: January 25, 1962

Card 1/1

MARKOV, A.A.

Difference measurements in multichannel spectrometers. Prib. i tekh. eksp. 7 no.3:30-35 My-Je '62. (MIRA 16:7)
(Optical measurements) (Spectrometer)

L 35349-66 EWT(m)

ACC NR: AR6017791 SOURCE CODE: UR/0058/66/000/001/A044/A04

AUTHOR: Markov, A. A.

TITLE: Coincidences of arbitrary multiplicity

SOURCE: Ref. zh. Fizika, Abs. 1A397

REF SOURCE: Tr. 6-y Nauchno-tekhn. konferentsii po yadern. radioelektron. T. 2. M., Atomizdat, 1965, 42-51

TOPIC TAGS: coincidence circuit, nuclear radiation, radiation measurement

ABSTRACT: The author considers one case that is frequently encountered in the practice of measurement of nuclear radiation, when it is necessary to register coinciden of arbitrary multiplicity from several (m) pickups. In this case all the signals entering the m inputs must be divided into two groups: a) noncoinciding and b) coin ciding, for at least two arbitrary inputs. Depending on the purpose of the system, it is necessary to ensure in it measurement of either only such signals when arbitra coincidence took place, or, to the contrary, signals which do not coincide. Several practical examples of measurement of nuclear radiation are presented, in which it is necessary to have such a coincidence registration system. Different methods of construction of such systems are analyzed. A method of constructing a system of this type, which appears to be the simplest, is described. M. L. [Translation of abstra

SUB CODE: 18, 09

Card 1/1

L 34797-66 EWT(d)/EWP(1) IJP(c) BB/GG

ACC NR: AR6017202 SOURCE CODE: UR/0058/65/000/012/A034/A034

AUTHOR: Markov, A. A.

TITLE: Calibration and stabilization of slope and shift of an amplitude characteristic

SOURCE: Ref. zh. Fizika, Abs. 12A323

REF SOURCE: Tr. 6-y Nauchno-tekhn. konferentsii po yadern. radioelektron. T. 1. M., Atomizdat, 1964, 81-89

TOPIC TAGS: coding, pulse amplitude, pulse amplifier, pulse height analyzer, automatic stabilization equipment

ABSTRACT: Methods are considered for calibrating and stabilizing the slope and shift of the amplitude characteristic of converters of an input quantity into a unitary code. It is noted that the gain calibration error of a proportional amplifier can be decreased by determining the gain from the measured ratio of increments of the input and output quantities. To stabilize the gain, it is proposed to apply to an auxiliary control input of the amplifier an error-signal voltage equal to the difference between the actual pulse amplitude and a standard signal converted from a pulse into a slowly varying voltage. In the case of a linear pulse-height discriminator with a characteristic shifted relative to zero, the stabilization of the shift can also be attained by means of a circuit that compares the output voltage pulse with a reference voltage. The slope of the characteristic can be stabilized with a cir-

Card 1/2

L 34797-66

ACC NR: AR6017202

cuit that compares the difference of two output signals. Corresponding calculation formulas are presented. G. K. [Translation of abstract]

SUB CODE: 09

Card 2/2

1ST AND 2ND COVERS — PROCESSES AND PROPERTIES INDEX — 3RD AND 4TH COVERS

MARKOV, A.

SA

A 42

e 2882. Extinction Method in Photometry of Just Visible Astro-
nomical Objects. A Markov. Comptes Rendus de l'Acad. des
Sciences, U.S.S.R. 1, pp. 449-451, March 11, 1936. English Abstract.
Laboratory experiments and a comparison of the results of previous
observers show that extinction methods are the most suitable for measuring
the brightness of the milky way, night sky, and the like, and also for faint
variable stars with rapid fluctuations. The apparatus of Wawilow [see
Abstract 4090 (1934)] is simple and accurate. Detailed tables appear
in the Russian text. The author also gives precautions to be observed in
applying the method to astronomy. I. I. M.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

MARKOV, A. A. (Andrey Andreyevich)

Nevozmozhnost' nekotorykh algorifmov v teorii assotsiativnykh siste . DAN, 55 (1947), 587-590. Nevozmozhnost'nekotorykh algorifmov v teorii assotsiativnykh sistem., II DAN, 58(1947), 353-356. O predstavlenii rekursivnykh formul. DAN, 58(1947), 1891-1892. On the representation of relatively definite functions. Matem. SB. 4(46),(1938). On the determinat on of the number of roots of an algebraic equation situated in a given domain. Mate . SB., 7(49), (1940), 3-6. O svobodnykh topologicheskikh gruppakh. DAN, 31(1941), 299-302.

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edited by Kurosh, A. G.
Markushevich, A. I.
Rashevskiy, P. K.
Moscow-Leningrad, 1948

MARKOV, A.A. Continued

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MARKOV, A. A.

Mbr., Mathematics Inst. im. V. A. Steklov, Dept. Physico-Math. Sci., A.S.

"On Unconditionally Closed Sets," Dok. AN, 44, No. 5, 1944

"The Impossibility of Some Algorisms in the Theory of Associative Systems/II" [illegible]., Dok. AN, 55, No. 7, 1947

"Representation of Recursive Functions," Iz. Ak. Nauk SSSR, Ser. Matemat, 13, No. 5, 1949

MARKOV, A.A.

[Principles of the algebraic theory of braids] Osnovy algebraicheskoi teorii kos. Akademiia nauk SSSR, Moscow-Leningrad, 1945. 53 p.
(Geometry, Differential--Projective) (MLRA 7:8)

MARKOV, A.A.

Markoff, A. A. Variation principles in the theory of plasticity. Appl. Math. Mech. [Akad. Nauk SSSR. Prikl. Mat. Mech.] 11, 339–350 (1947). (Russian. English summary)

The author proves three minimum principles concerning the velocity field in an incompressible perfectly plastic solid which obeys the stress-strain relation of von Mises. The simplest of these principles is concerned with the case where the velocities are prescribed on the surface subject, of course, to the condition that the surface integral of the normal velocity component vanishes. If the velocity strain is denoted by e_{ij}, and if $E=(e_{ij}e_{ij})^{\frac{1}{2}}$, the minimum principle in question can be formulated as follows: among all velocity distributions which satisfy the boundary conditions and the equation of incompressibility, the actual distribution furnishes the smallest value for the volume integral of the invariant E. The author's other minimum principles are concerned with the cases where (a) the stresses are given on the surface or (b) the tangential stresses and the normal velocity. The minimum principles are used to establish uniqueness of the stresses in the interior (to within an arbitrary constant hydrostatic pressure). [The author assumes tacitly that the boundary conditions assure plastic behavior throughout the body. In many practically important cases (e.g., indentation problems) this assumption is not justified.]

W. Prager (Providence, R. I.).

Source: Mathematical Reviews, 1948, Vol 9, No. 2

MARKOV, A.

Markoff, A. On the impossibility of certain algorithms in the theory of associative systems. C. R. (Doklady) Acad. Sci. URSS (N.S.) 55, 583-586 (1947).

Two theorems on recursive unsolvability in associative systems with a finite set of generators and relations are stated, and proved in outline. Theorem 1 asserts the unsolvability of the word (identity) problem and is identical with a theorem of E. L. Post [see the preceding review]. The method of proof is essentially similar, making use of an earlier result of Post [Amer. J. Math. 65, 197-215 (1943); these Rev. 4, 209] and Rosser's combinatorial logic [Ann. of Math. (2) 36, 127-150 (1935)]. Theorem 2 states that an associative system can be constructed in which the word problem is solvable but the division problem is unsolvable, i.e., the question whether $XQ \leftrightarrow R$ has a solution in the system for any given Q and R. Let A be a finite alphabet and G_i, G_i' ($i=1, 2, \cdots, m$) words in it such that the word problem is unsolvable under the one-way substitution laws "$G_iP \rightarrow PG_i'$ for any word P" [Post, op. cit. (1943)]. Then a system for theorem 2 is obtained by adding the new letters d, f, e_i to the alphabet and taking as relations $e_if \leftrightarrow fe_i$, $e_iG_ia \leftrightarrow ae_iG_i$, $e_iG_id \leftrightarrow G_i'd$ ($a \in A$, $i=1, \cdots, m$).

M. H. A. Newman (Manchester).

Source: Mathematical Reviews, Vol 8 No. 10.

MARKOV A

2

Markov, A. On certain insoluble problems concerning matrices. Doklady Akad. Nauk SSSR (N.S.) 57, 539–542 (1947). (Russian)

Let a square matrix with integers as elements and determinant 1 be called "admissible." If $\{X_1, X_2, \cdots, X_p\}$ is a finite set of admissible n-matrices, the semi-group of all matrices expressible as products of X's is denoted by $S(X_1, X_2, \cdots, X_p)$. Theorem 1. If $n \geqq 4$ there is no algorithm (in the sense of Church-Kleene-Turing) for deciding whether, given two finite sets, $X_1, X_2, \cdots, X_p$ and $Y_1, Y_2, \cdots, Y_q$ of admissible n-matrices, the sets $S(X_1, X_2, \cdots, X_p)$ and $S(Y_1, Y_2, \cdots, Y_q)$ have a common member. Moreover (corollary) all the Y's, and all X's but one, can be chosen and fixed, so that the question remains undecidable when the remaining X varies; the number q can here be 2, and p can also be chosen independent of n.

Proof. By a theorem of E. L. Post [Bull. Amer. Math. Soc. 52, 264–268 (1946); these Rev. 7, 405] there is no algorithm for deciding whether, given p pairs, G_i, G_i' of words in two letters, a and b, there exists an identity $G_{i_1}G_{i_2}\cdots G_{i_m} = G'_{i_1}G'_{i_2}\cdots G'_{i_m}$; and Post's proof shows that all the G's and all but one of the G''s can be chosen so that the question is still undecidable when the remaining G' varies. The two matrices

$$A=\begin{pmatrix}1 & 1\\ 0 & 1\end{pmatrix},\quad B=\begin{pmatrix}1 & 0\\ 1 & 1\end{pmatrix}$$

generate a free semi-group $S(A, B)$ [J. Nielsen, Danske Vid. Selsk. Math.-Fys. Medd. 5, no. 12 (1924)]. Hence the question whether, given p pairs of matrices Z_i, Z_i', each equal to A or B, there exists a relation $\prod_1^m Z_{i_r} = \prod_1^m Z'_{i_r}$ is undecidable; or, what is the same, the question whether some $\prod (Z_{i_r} \dotplus Z'_{i_r})$ is in $S(A \dotplus A, B \dotplus B)$, where $\dotplus$ denotes the direct sum (4-matrix). This proves the case $n=4$, and the extension to $n>4$ is trivial.

Theorem 2. If $n \geqq 4$ there is no algorithm for deciding whether, given admissible n-matrices $X_1, X_2, \cdots, X_p$ and $Y_1, Y_2, \cdots, Y_q$, the set $S(X_1, X_2, \cdots, X_p)$ and the additive group $L(Y_1, Y_2, \cdots, Y_q)$ generated by the Y's, have a common member. All the Y's, and all the X's but one, can be fixed [corollary 1]; or all the X's can be fixed [corollary 2]; and the question is still undecidable when the remaining X, or the Y's, vary. (Here q can be 5, and p independent of n.) This is proved similarly, by taking Y_1, Y_2, Y_3, Y_4 to be the four 4-matrices $F_{rs} = E_{rs} \dotplus E_{rs}$, where E_{rs} has 1 in position (r, s) and 0 elsewhere. Then $L(Y_1, Y_2, Y_3, Y_4)$ consists of all matrices $Z \dotplus Z$ (Z admissible).

M. H. A. Newman (Manchester).

Source: Mathematical Reviews, 1948, Vol 9, No. 5

MARKOV, A.

Markov, A. The impossibility of certain algorithms in the theory of associative systems. II. Doklady Akad. Nauk SSSR (N.S.) 58, 353–356 (1947). (Russian)

The first part of the paper is concerned with sharpening the author's theorems 1 and 2 [same Doklady (N.S.) 55, 583–586 (1947); these Rev. 8, 558] on the unsolvability of the word problem in associative systems [demi-groups, Thue systems], and on the unsolvability of the division problem ("has $XQ \leftrightarrow R$ a solution for given Q and R?"), respectively. (Notations: $X \vdash Y$ means that word X may be replaced by word Y, $X \perp Y$ means $X \vdash Y$ and $Y \vdash X$, $X \leftrightarrow Y$ means that $PXQ \perp PYQ$ for any P and Q.) (A) A system may have a solvable word problem and solvable left-division problem, but unsolvable right-division problem, $XH_1 \leftrightarrow R$; and here

Source: Mathematical Reviews, 1/2 Vol 9 No. 7

Markov, A.

H_1 can be a fixed word. (B) An associative system is given having no decision algorithm for $X \leftrightarrow 0$ (the empty word). Proofs rest on E. L. Post's unsolvable word problem under a set of one-way substitutions $G_iP \vdash PG_i'$ $(i=1, 2, \cdots, m)$, G_i and G_i' fixed, P arbitrary [Amer. J. Math. 65, 197–215 (1943); these Rev. 4, 209].

In the second part of the paper a new step is taken by the construction of a class of associative systems with unsolvable word problem, having only a moderate number of defining relations which can easily be written out without abbreviation. In examples hitherto constructed the relations contain in effect a specification of the class of recursive functions and are correspondingly complicated. From the sparse indications given in the present paper, it appears that the complications are transferred from the relations to the class of words within the system for which the equivalence problem is posed. The main theorem is as follows. The alphabet consists of (a, b, c, d, e). Let V be an arbitrary word in the letters a and b, and U any word in a, b, c, d beginning and ending with d, in which every two c's are separated by at least one d. Then there is no algorithm for deciding whether UeV goes into $Ue a$ by means of the single rule (α) $PdQcRdSeQT \perp PdQcRdSeTR$, where P, S, T are arbitrary words in a, b, c, d, e; Q and R arbitrary words in a, b. The following two results are to be used in the proof. (1) In the problem of Post referred to above the one-way substitutions $G_iP \vdash PG_i'$ may be replaced by symmetrical ones $K_iP \perp PK_i'$. [Cf. lemma 11 of Post, J. Symbolic Logic 12, 1–11 (1947); these Rev. 8, 558.] (2) If L_i, L_i' $(i=1, \cdots, q)$, V, W are words in a, b, a necessary and sufficient condition that V go into W by means of $L_iP \perp PL_i'$ is that $dL_1cL_1' \cdots dL_qcL_q'deV$ goes into $dL_1cL_1' \cdots dL_qcL_q'deW$ by means of (α). An associative system C_1 on 13 letters is given, with 33 defining relations $X \leftrightarrow Y$, where no X or Y contains more than three letters, which can be shewn by the main theorem (presumably using the examples constructed in the first part of the paper) to have an undecidable word problem; in a slightly more complicated system C_4 the problem $X \leftrightarrow H_0$ is undecidable, where H_0 is a fixed 3-letter word. No details of the proof are given.

M. H. A. Newman (Manchester).

Source: Mathematical Reviews 2/2 AM Vol 7 No. 7

MARKOV, A. [A.]

Markov, A. On the representation of recursive functions. Doklady Akad. Nauk SSSR (N.S.) 58, 1891–1892 (1947). (Russian)

S. C. Kleene has proved (A) that every general recursive function of n variables can be represented in the form

$$(1) \qquad P(\mu y \cdot Q(x_1, \cdots, x_n, y) = 0),$$

where P and Q are primitive recursive, and $\mu y \cdot X$ is the least natural number y such that X holds, or 0 if there is none [Math. Ann. 112, 727–742 (1936)]; and (B) that a fixed "universal" primitive recursive function P can be found, such that all general recursive functions are obtained by suitable choice of primitive recursive Q in (1) [Trans. Amer. Math. Soc. 53, 41–73 (1943); these Rev. 4, 126]. In the present note the theorem is announced [without proof] that a necessary and sufficient condition for a primitive recursive function $P(x)$ to be universal, in the above sense, is that it takes every natural number as value an infinity of times.

M. H. A. Newman (Manchester).

Source: Mathematical Reviews Vol 9 No. 8

MARKOV, A. A.

*Markov, A. A. Izbrannye Trudy po Teorii Nepreryvnyh Drobei i Teorii Funkcii Naimenee Uklonyayuščihsya ot Nulya. [Selected Papers on Continued Fractions and the Theory of Functions Deviating Least from Zero]. OGIZ, Moscow-Leningrad, 1948. 411 pp. Contains a biography and notes by N. I. Ahiezer.

Source: Mathematical Reviews, Vol 11 No. 3

MARKOV, A. A.

Markov, A. A. On the dependence of axiom B6 on the other axioms of the Bernays-Gödel system. Izvestiya Akad. Nauk SSSR. Ser. Mat. 12, 569-570 (1948). (Russian)

Simplification of the system of axioms for set-theory given by Bernays [J. Symbolic Logic 2, 65–77 (1937)] and modified by Gödel [The Consistency of the Continuum Hypothesis, Princeton University Press, Princeton, N. J., 1940; these Rev. 2, 66]. *A. Heyting* (Amsterdam).

Source: Mathematical Reviews, Vol 10 No. 7

MARKOV, A. A.

Markov, A. A. On the representation of recursive functions. Izvestiya Akad. Nauk SSSR. Ser. Mat. 13, 417–424 (1949). (Russian)

This paper gives a detailed proof that a necessary and sufficient condition that a primitive recursive function $P(x)$ be such that every recursive function of n variables can be represented, for suitable primitive recursive Q, in the form $P[\mu y \cdot Q(x_1, \cdots, x_n, y) = 0]$ is that $P(x)$ take every natural number as value infinitely many times. This result was announced earlier [Doklady Akad. Nauk SSSR (N.S.) 58, 1891–1892 (1947); these Rev. 9, 403]. The sufficiency part is constructive in terms of certain results of Kleene's [cited in the above-mentioned review]; the necessity proof is nonconstructive, but has a weakened constructive counterpart.

H. B. Curry (State College, Pa.).

Source: Mathematical Reviews, Vol 11 No. 3

MARKOV, A. A.

Markov, A. A. Three papers on topological groups: I. On the existence of periodic connected topological groups. II. On free topological groups. III. On unconditionally closed sets. Amer. Math. Soc. Translation no. 30, 120 pp. (1950).

Translated from Izvestiya Akad. Nauk SSSR. Ser. Mat. 8, 225–232 (1944); 9, 3–64 (1945); Mat. Sbornik (N.S.) 18(60), 3–28 (1946); these Rev. 7, 7, 412.

Source: Mathematical Reviews, Vol 12 No. 5

MARKOV, A. A. 191T75

USSR/Mathematics - Approximations Jul/Aug 51

"Ideas of P. L. Chebyshev and A. A. Markov in the Theory of Limit Magnitudes of Integrals and Their Further Development," M. G. Kreyn, P. G. Rekhtman

"Uspekh Matemat Nauk" Vol VI, No 4 (44), pp 3-120

Discusses fundamental theorem concerning positive sequences, max mass, main properties of Chebyshev's system of functions, canonical representations of a positive sequence, existence of the main representations, motion of the masses of canonical representations, mech quadratures and soln of an extremal problem, Chebyshev-Markov inequalities, case of infinite integral, the phi-psi problem of Markov, and a min problem.

191T75

MARKOV, A. A.

Markov, A. A. The theory of algorithms. Trudy Mat. Inst. Steklov., v. 38, pp. 176–189. Izdat. Akad. Nauk SSSR, Moscow, 1951. (Russian) 20 rubles.

The author considers that the Church-Kleene-Turing theory of computability touches the idea of "algorithm" so indirectly as to make an independent development desirable. After somewhat lengthy preliminaries (e.g. definition of an "occurrence" of one word in another) an "algorithm $\mathfrak{A}$ in normal form" is defined as follows It is (or is determined by) a list of instructions in one of the forms

$$P \to Q \quad \text{or} \quad P \to \cdot Q,$$

where P and Q are words in some alphabet; either or both of P or Q may be the empty word (i.e. absent). Thus $ab \to ba$ and $a \to \cdot$ and $\to$ are possible instructions. The order of the instructions in the list must be specified. To apply the algorithm to a given word X, take the first instruction in the list whose left-hand side occurs in X (the empty word occurs before and after every letter), and replace the first occurrence of P by Q. If there is a dot after the arrow this ends the process; if not, apply $\mathfrak{A}$ in the same way to the resulting word; and so on. If the process terminates the final result is $\mathfrak{A}(X)$.

In support of the claim that this gives a satisfactory meaning of "algorithm" it is asserted that (1) every algorithm $\mathfrak{A}$ in the rather vague sense of ordinary mathematics, is equivalent to some normal algorithm $\mathfrak{N}$, i.e. applied to any given word X, $\mathfrak{N}$ terminates if and only if $\mathfrak{A}$ does, and then $\mathfrak{N}(X) = \mathfrak{A}(X)$; (2) various specified combinations of normal algorithms (iteration, juxtaposition of results, etc.) are equivalent to normal algorithms; (3) a "universal normal algorithm" $\mathfrak{U}$ exists such that, if the instructions specifying $\mathfrak{A}$ are combined in an obvious way (with spacing symbols) into a single word $\mathfrak{A}^*$, $\mathfrak{U}(\mathfrak{A}^* P) = \mathfrak{A}(P)$ (if either exists, $\mathfrak{A}^* P$ denoting mere juxtaposition). No indications of the proofs are given. The word $\mathfrak{A}^*$, translated into a 2-letter alphabet, is the "signature" of the algorithm $\mathfrak{A}$. A normal algorithm is "self-applicable" if its application to its own signature terminates. There is no normal algorithm which terminates for just those words that are signatures of non-self-applicable

Source: Mathematical Reviews, Vol 13 No. 9

2

normal algorithms (proved by the usual Cantor-type argument). It follows by familiar arguments that the range of $\mathfrak{U}$ (above) is not discernible, i.e. there is no normal algorithm $\mathfrak{A}$ that terminates for every X and is such that $\mathfrak{A}(X)$ is the empty word if and only if $\mathfrak{U}$ terminates when applied to X.

In spite of his initial references, the author makes no mention of the question that will occur to every reader: what is relation between "normal algorithms" and computability à la Church-Kleene-Turing? It is obvious that normal algorithms can be programmed on a computing machine, indeed they resemble instruction-tables for existing machines a good deal more closely than do the tables for Turing's original "paper" machine [Proc. London Math. Soc. (2) 42, 230–265 (1936)]. The strong resemblance between the general course of this theory and Turing's [op. cit.] makes it likely that there is full equivalence. If that is so the interest of this theory will lie in its provision of a new and particularly simple means of constructing unsolvable problems. [In the "theorem on a universal algorithm", foot of p. [illegible], for the first two occurrences of $\mathfrak{A}$ read $\mathfrak{U}$.]

M. H. A. Newman (Manchester).

Source: Mathematical Reviews, Vol 13 No. 9

2

MARKOV, A.

Markov, A. The impossibility of certain algorithms in the ~~theory of~~ associative systems. Doklady Akad. Nauk SSSR (N.S.) 77, 19–20 (1951). (Russian)

In this review (but not in the paper) $[C, A]$ or $[C]$ denotes the associative system determined in the alphabet A by the set of relations C. The problem of the existence of algorithms for deciding the following questions is considered: given an alphabet A and finite sets, C_1 and C_2, of relations, (1) are $[C_1]$ and $[C_2]$ isomorphic? (2) does $[C_1]$ contain only one member? (3) is it a group? (4) contained in a group? (5) is it a semi-group [with cancellation]? (6) ("the meta-problem of identity") is $[C_1]$ a system in which the identity-problem [=word-problem] is solvable? A negative answer is given in all six cases: no such algorithms exist for an alphabet with 4 or more letters.

An outline of the proof is given. A system $[C_5, A_5]$ of an earlier paper [same Doklady (N.S.) 58, 353–356 (1947); these Rev. 9, 321] is first transformed by Post's method [E. L. Post, Bull. Amer. Math. Soc. 50, 284–316 (1944); these Rev. 6, 29] into a system $[D, A_0]$ where A_0 is the 2-letter alphabet $\{a, b\}$. Given any two words G, H of A_0, let $D_{G,H}$ be the set of relations in $B = \{a, b, c, d\}$ formed by adjoining the relations $cGd \leftrightarrow 0$ and $\xi cHd \leftrightarrow cHd$ ($\xi = a, b, c, d$) to D. In the system $[D_{G,H}, B]$ the answer to questions (2) to (6) is "Yes" if, and only if, $G \leftrightarrow H$ in $[D, A_0]$. Since $[C_5, A_5]$, and therefore also $[D, A_0]$, has an unsolvable word problem [Markov, as above] this proves the unsolvability of (2) to (6), and that of (1) follows.

M. H. A. Newman (Manchester).

Source: Mathematical Reviews, Vol 1.3 No. 9.

MARKOV, A.

Markov, A. The impossibility of algorithms for the recognition of certain properties of associative systems. Doklady Akad. Nauk SSSR (N.S.) 77, 953–956 (1951). (Russian)

A general theorem is announced, with an outline proof, from which the results of a previous paper [same vol., 19–20 (1951); these Rev. 12, 661; called M1 in this review] follow as special cases. Let "K-system" mean "associative system with a finite set of generating relations". A K-system, S, is said to be included in another, T, if S is isomorphic to a subsystem of T. A property P of K-systems is invariant if it is preserved under isomorphisms. As in the cited review, we denote by $[R, A]$ the K-system defined by the relations R in the alphabet A. The "recognition problem" for a property P and an alphabet A is the problem of finding an algorithm for deciding, for any finite set of relations R in A, whether or not $[R, A]$ has the property P. Theorem 1. Let P be an invariant property of K-systems. If there exist both a K-system having the property, and a K-system not included in any K-system having the property, then there exists an alphabet for which the recognition problem for P is unsolvable. If a K-system with the property P is definable with n letters, the recognition problem for P is unsolvable for alphabets of $\geqq m+4$ letters.

The method of proof is a generalisation of that used in M1, the relations D and alphabet $B=\{a, b, c, d\}$ of that paper being replaced by $R_2 \cup R_4$ and $B \cup B_4$ respectively, where R_2, R_4 and B_4 are as follows. $[R_2, \{a, b\}]$ is a K-system that includes (in the above sense) the "direct product" of a K-system S_1 having an unsolvable word-problem, and a K-system S_0 not included in any having property P. (Here the "direct product" of $[R, A]$ and $[R', A']$ is $[R \cup R', A \cup A']$, provided that $A \cap A' = \phi$.) The system $[R_4, B_4]$ is a K-system having property P, such that $B \cap B_4 = \phi$. An immediate corollary of the theorem is that if P is a hereditary property, i.e., holds for all subsystems of K-systems that have the property, and if there exist K-systems that have, and K-systems that have not the property, then the recognition problem is unsolvable for alphabets of 4 or more letters. A deduction from the main theorem not included in M1 is that there is no algorithm for deciding if a given K-system is finite.

M. H. A. Newman (Manchester).

Source: Mathematical Reviews, Vol 13 No.

Markov, A

Markov, A. On an unsolvable problem concerning matrices. Doklady Akad. Nauk SSSR (N.S.) 78, 1089–1092 (1951). (Russian)

The following theorem is proved. If $n \geqq 6$, a set of 102 n-rowed square matrices U_i with rational integral elements can be found, such that the problem of deciding whether any given integral matrix U of the same size is expressible as a finite product $\prod U_{i_r}$ is unsolvable (in the usual sense, that no algorithm or machine routine exists). The proof, which is given in full, depends on an earlier unsolvability theorem of the author on matrices [same Doklady 57, 539–542 (1947); these Rev. 9, 221]. The transformation of the one problem into the other depends on ingenious but elementary algebra. The author believes that the number 102 can probably be lowered. *M. H. A. Newman* (Manchester).

Source: Mathematical Reviews, Vol 13 No 2

MARKOV, A. A.

"Impossibility of Certain Algorisms in the Theory of Associative Systems,

Dok. AN, Vol. 78, No. 1, 1951

Discusses following problems which arise in study of associative systems defined by finite systems of relations in given algebra A: isomorphy, unity, uniqueness, recognition of groups, inclusiveness in group, recognition of subgroup, and meta-problem of identity. Finds for each letter A containing more than ? letters each of the above problems in unsolvable: The sought-for algorithm in this problem is impossible. Submittted 4 Jan 51 by Acad I. M. Vinogradov

179T47

DELONE, B.N.; KUROSH, A. G.; KOLMOGOROV, A. N.; MARKOV, A. A.; GELFOND, A. O.;

Algebra

Development of algebra. Usp. mat. nauk 7 No. 3, 1952.

9. Monthly List of Russian Accessions, Library of Congress, November 1952, Uncl.

USSR/Mathematics - Symbolic Logic
Unsolvability

Jul/Aug 52

"Unsolvable Algorithmic Problems," A.A. Markov, Leningrad

"Matemat Sbor" Vol XXXI (73), No 1, pp 34-42

A lecture given at conference on algebra and number theory in Moscow in Sep 51, representing a summary of results obtained by the author in recent years in the theory of algorithms. By "algorithm" one understands an exact instruction (order or direction) which defines a computational

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process proceeding from original data that can be varied to the desired result. Cites E.L. Post, "Recursive Unsolvability of a Problem of Thue," Jour of Symbolic Logic, 12, 1947, 1-11. Submitted 22 Feb 52.

220T73

MARKOV, A. A.

2ᴗ0T75

MARKOV, A. A.

USSR/Mathematics - Algorithm Theory 21 May 53

"Strengthening the Theorem of Reduction (Adduction) in the Theory of Algorithms," N. M. Nagornyy

DAN SSSR, Vol 90, No 3, pp 341-342

Strengthens the theorem given by A. A. Markov (Trudy Matemat In-ta imeni Steklova, 38 (1951)) as a consequence of the theorem on algorithm reduction. This theorem states that each normal algorithm over algorithm A is equivalent relative to A to a certain normal algorithm in the alphabet A cup (a,b), where a and b are letters not belonging in A. The

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theorem permits one to reduce any normal algorithm over alphabet A to an equivalent, relative to A, normal algorithm in a 2-letter expansion of alphabet A. Acknowledges attention of Prof A. A. Markov. Presented by Acad V. I. Smirnov 18 Mar 53.

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MARKCV, A. A.

USSR/Mathematics - Inequalities 11 ...

"Generalization of Inequalities of S. N. Bernshtey and A. A. Markov," N. K. Bari

DAN SSSR, Vol 90, No 5, pp 701-702 , 1953

Subject inequalities and those of A. Zygmund are widely used in studying the best approximations of a function by means of trigonometric polynomials and also in investigating convergence and summability of Fourier series and their conjoints; however, in order to utilize these inequalities one must know what properties are possessed by the considered function on an interval of length 2π, which means that, if the

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function's behavior is investigated on an interval [a,b] of length less than 2π, the corresponding theorems lose some force. Generalize 3 theorems apropos of this case. Presented by Acad A. N. Kolmogorov.

MARKOV, A.A.; PETROVSKIY, I.G., akademik, redaktor; NIKOL'SKIY, S.M., professor; SAZONOV, L.S., redaktor; ARONS, R.A., tekhnicheskiy redaktor.

Theory of algorithms. Trudy Mat.inst. 42:3-374 '54. (MIRA 8:5)
(Algorism)

MARKOV, A. A.

"Work of Soviet Mathematicians in the Domain of Constructive Analysis,"

"On the Principle of Constructive Selection,"

paper either presented or distributed at the Intl. Colloquium on the Different Notions of Constructivity in Mathematics, 26-31 Aug 57, Amsterdam,

B-3,095,946, 20 Jan 1958

30-8-3/37

AUTHOR: Markov, A.A., Corresponding Member of the AN USSR

TITLE: Mathematical Logic and Determination Mathematics (Matematicheskaya logika i vychislitel'naya matematika)

PERIODICAL: Vestnik Akademii Nauk SSSR, 1957, Vol.27, Nr 8, pp.21-25 (USSR)

ABSTRACT: The author at first gives explanatory specifications on the reciprocal connection between the two fields of science mentioned above. One of the basic methods of mathematical logic is the construction of proof. Formulating of the axioms and theorems is, by making use of a special system of symbolics, represented by the usual formulae. After concrete specifications on the "method of determination" the author gives an example for one of these possibilities (in form of an equation proof, see page 22). In conclusion the author deals with algorithms and underlines their great importance in mathematical logic. An important task is imposed upon mathematical logics with respect to the programmatical working through of the further development of electron computation machines. It may be expected that the attitude towards

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Mathematical Logic and Determination Mathematics

these problems will have a stimulating effect on one of the most important fields of mathematical logic, the algorithm theory.

AVAILABLE: Library of Congress

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AUTHOR: MARKOV, A.A. Corresponding Member Acad. Sc. USSR [illegible]42

TITLE: On the Inversion Complexity of Function Systems (Ob inversionnoy slozhnosti sistem funktsiy)

PERIODICAL: Doklady Akad.Nauk, SSSR, 1957, Vol.116, Nr 6, pp. 917-919 (USSR)

ABSTRACT: Generalizing E.N. Gilbert's investigations (Ref. 2) concerning the inversion complexity of a Boolean function the author considers the inversion complexity Inv $(f_1, \ldots, f_m)$ of a system $f_1, \ldots, f_n$ of m Boolean functions of n arguments.

Let the maximum Inv $(f_1, \ldots f_m)$ of the 2^{m2^n} different systems $f_1, \ldots, f_m$ be $I(n,m)$. Then it is: 1. $I(n,1) = pd(D(n+1))$ and 2. $I(n,m) = D(n)$ for $m > 1$. Here $D(r)$ is the smallest natural number y for which it holds $r < 2^y$, and $pd(r)$ is the integer of least distance to r which is not greater than r. If particularly it is $m = 1$, then it is

$$Inv(f) = pd\,(D(Alt(f))),$$

whereby it is $0 \leqslant Alt(f) \leqslant n+1$ and the symbol $Alt(f)$ is defined by certain alternating chains. There are 2 references,

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On the Inversion Complexity of Function Systems 42

1 of which is Slavic.

ASSOCIATION: Mathematics Institute imeni V. A. Steklov, Acad. Sc. USSR (Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR)

SUBMITTED: May, 17, 1957

AVAILABLE: Library of Congress

Card 2/2

MARKOV, A A

SOV/1707

PHASE I BOOK EXPLOITATION

16(1)

Akademiya nauk SSSR. Matematicheskiy institut

Problemy konstruktivnogo napravleniya v matematike; sbornik rabot, vyp. 1 (Problems Connected With the Construction Trend in Mathematics; Collection of Articles, Nr 1) Moscow, Izd-vo AN SSSR, 1958. 348 p. (Series: Its: Trudy, t. 52). 2,500 copies printed.

Ed.: N.A. Shanin; Resp. Ed.: I.G. Petrovskiy, Academician; Deputy Resp. Ed.: S.M. Nikol'skiy, Professor; Tech. Ed.: R.A. Arons.

PURPOSE: This book is intended for mathematicians.

COVERAGE: The book is a collection of works presented at the seminar on mathematical logic of the Leningrad Branch of the Matematichesk[illegible] institut imeni V.A. Steklova (Mathematical Institute imeni V.A. Steklov) of the Academy of Sciences, USSR. The articles deal primarily with problems connected with the constructive trend in mathematics. A detailed study is made of the theory of algorithm[illegible] and constructive mathematial logic. The book is divided into

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three main parts: I. The General Theory of Algorithms and Its Application to the Theory of Associative Calculations. II. Constructive Mathematical Logic. III. Constructive Mathematical Analysis.

TABLE OF CONTENTS:

Problems Connected With the Construction (Cont.) SOV/1707

PART III. CONSTRUCTIVE MATHEMATICAL ANALYSIS

Markov, A.A. On Constructive Functions 315

Introduction 1. Recursive functions with rational values 2. Regularly converging sequences 3. Constructive real numbers 4. Constructive sequences of real numbers 5. Constructive functions of a real variable. References

AVAILABLE: Library of Congress

Card 5/5

LK/ad
6-15-59

MARKOV A A

AUTHOR: None Given.

TITLE: All-Union Conference on the Theory of R... (Vsesoyuznoye soveshchaniye po teorii ... deystviya).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye ... Nauk, 1958, No.2, pp. 167-168 (USSR).

ABSTRACT: The Institute of Automation and Telemech... of the Ac. Sc. USSR (Institut Avtomatiki i Telemekhaniki Ak... Nauk SSSR) convened in October, 1957 an All-Union Conference on the theory of relay systems. ... of the conference was to evaluate the present ... of the problem of the theory of relay operation, ... evaluation of the problems of synthesis, ... transformation of the structure of relay equipment, optimum construction and assembly of such structures, automation of the processes of synthesis ... of such structures. Over 540 ... establishments, works' laboratories ... tions from numerous centres of the USSR ... scientists from Roumania, Hungary and Czechoslovakia participated in the conference.

Card 1/5 In his opening address M. A. Gavrilov ...

All-Union Conference on the Theory of Relay [illegible]

present state and the main trends of [illegible] the theory of relay circuits.
Thirty papers were read including "O[illegible] of Mathematical Logic [illegible] Engine[illegible] by S. A. Yanovskaya, "Algebraic Theory of [illegible] of Relay-Contact Circuits" by Gr. K. M[illegible] "On the Invertion Conditions of [illegible]" by A. A. Markov, "Minimal Disjunctive [illegible] "Full" Functions" by F. Popovici (Bucharest), "O[illegible] and [illegible] of the Theory of R[illegible]" by S. V. Yablonskiy.
The technique of operation [illegible]: "Technique [illegible] Minimum Number of Relays Necessary [illegible] a Relay Circuit with Given Conditions of [illegible] V. G. L[illegible]v; "Matrix Method [illegible] Functions in the Theory of Contact Circuits" by A. [illegible], "On the Theory of Synthesis of Contact Circuits" [illegible] F. Svoboda (Prague); "Construction of [illegible] with Bridge Connections" by M. A. G[illegible]; "[illegible] Synthesis of Multi-Pole Relay-Contact Circuits" [illegible] V. N. Grebenshchikov; "Application of [illegible]

Card 2/5

All-U.

All-Union Confer...

of structur... of relay equipment. ... further development, particularly ... for the synthesis of structures. ... Conference pointed out the advisability ... a coordinating commission relating ... of relay systems ... of establishing ... Federation relating to this problem.

(Note: ...)

AVAILABLE: Library of Congress.

Card 5/5

MARKOV, A.

"Mathematical logic and computational mathematics. Tr. from the Russian"

Fiziko-Matematichesko Spisanie. Sofiia, Bulgaria. Vol. 1, no. 3/4, 1958

Monthly list of East European Accessions (EEAI), LC, Vol. 8, No. 6, Jun 59, Unclas

MARKOV, A.A.

Constructive functions. Trudy Mat. inst. 52:315-348 '58. (MIRA 11:7)

(Mathematical analysis)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032420014-4"

AUTHOR: ~~Markov, A.~~ (Corresponding Member of the Academy of Sciences of the USSR) SOV/20-121-2-6/5

TITLE: The Unsolubility of the Problem of Homeomorphy (Nerazreshimost problemy gomeomorfii)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 2, pp 218-220 (USSR)

ABSTRACT: The determination of an algorithm with the aid of which it can be investigated whether two arbitrary given polyhedra (manifolds) are homeomorphic or not, is denoted by the author as the problem of homeomorphy. A natural restriction consists in the establishment of one of the compared polyhedra; then it has to be investigated whether the other polyhedra are homeomorphic to the given one.

Principal theorem: Let $n > 3$. The manifold is understood in the sense of Poincaré [Ref 4] and Veblen [Ref 5]. For every n there exists an n-dimensional manifold M^n such that the problem of homeomorphy of the manifolds to M^n is unsolvable.

In an analogous manner the problem of the homotopic equivalence is given; in this case the correspondingly changed above principal theorem is valid too.

There are 5 references, 2 of which are Soviet, 2 American, and 1 Italian.

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The Unsolvability of the Problem of Homeomorphy SOV/20-121-2-6/53

SUBMITTED: March 21, 1958

Card 2/2

16(1)

AUTHOR: Markov, A. (Corresponding Member of the AS USSR) SOV/20-123-6-6/50

TITLE: On the Unsolvability of Some Topological Problems (O nerazreshimost nekotorykh problem topologii)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6, pp 978-980 (USSR)

ABSTRACT: The present paper improves and precises the earlier results of the author [Ref 3].

Let the complex K be related to the complex L if: K and L are connected and their fundamental groups are isomorphic, or if at least one of these complexes is not connected.

Let $\mathfrak{R}$ and γ be binary relations between complexes. $\mathfrak{R}$ is called stronger than γ, if K always has a relation γ to L, if K has a relation $\mathfrak{R}$ to L. Let the binary relation $\mathfrak{I}$ lie between $\mathfrak{R}$ and γ if $\mathfrak{R}$ is stronger than $\mathfrak{I}$ and $\mathfrak{I}$ is stronger than γ.

Principal results: To every natural $n > 3$ there exists a connected closed n-dimensional manifold M^n so that for every binary relation $\mathfrak{R}$ lying between the combinatoric equivalence and the relationship the problem of distinction of the relation $\mathfrak{R}$ to M^n among the n-dimensional manifolds is unsolvable.

Herefrom there follows that the general problem of distinction of

Card 1/2

On the Unsolvability of Some Topological Problems SOV/20-123-6-6/50

the combinatoric equivalence is unsolvable.
There are 5 references, 2 of which are Soviet, 2 American, and 1 Dutch.

ASSOCIATION: Matematicheskiy institut imeni V.A.Steklova Akad.n.SSSR (Mathematical Institute imeni V.A.Steklov of the AS USSR)

SUBMITTED: October 21, 1958

Card 2/2

16,4000 (1031,1344,1132) 26083 P/021/61/000/002/001/001
A107/A126

AUTHOR: Markov, A.A., Professor, Doctor, Chairman, Corresponding Member

TITLE: Development of cybernetics in the Soviet Union

PERIODICAL: Przegląd Elektrotechniczny, no. 2, 1961, 53 - 55

TEXT: The basic element of cybernetics is the information based on associations given by the nature's order, evoking the situation A as a consequence of the previous situation B. The Soviet Mathematician A.N. Tikhonov proved that the division of the temperature of an earth stratum depends on its depth and contains information on temperature changes of the earth surface in the past. This example demonstrates the process of information arising when the temperature of the earth surface is expressed as the situation A and the temperature in the past computed according to established rules, as the situation B. If the situations A and B are divided by time or space the forwarding of information takes place. The author describes the Shannon theory and the established coding of information. Soviet scientist A.N. Kolmogorov, A.Ya. Khinchin, A.M. Yaglom and I.M. Gelfand investigated this problem, whereas A.Ya. Khinchin and V.R. Varshamov investigated the problem of coding. The synthesis of steering systems, based on contact ele-

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ments, was successfully investigated by Soviet scientists. A partial answer to the problem of the Bool function in relation to n arguments was given by Shannon. The Soviet mathematician, O.B. Lupanov, found this solution by changing n + 2 into n. This achievement is based on a new interpretation of the Bool's function and on new methods of contact synthesis expressed by

$$\frac{2^n}{n}(1-\varepsilon) < L(n) < \frac{2^n}{n}(1+\varepsilon),$$

at which the condition is a sufficient high n value. Lupanov obtained results for various additional systems based on functional elements, especially for programming computers. An example of a functional element is the alternator in which electronic valves and semi-conducting diodes are used. Similar is the system of two entries, called conjunctor. The negator is a function element registrating negations. By assembling conjunctors, alternators and negators it is possible to build up unlimited Bool functions or systems related to those functions. Our nervous system can be regarded as a system of neurone functions. Evaluating the composition of such systems it is advisable to replace the number of function elements by a "weight" for each element, expressed by plus values. According to Lupanov it is possible to relate free established weights to given function elements. Analogue to the Shannon system, tolerable figures of matching weight can be used for contact systems. The author describes results of investigations performed by the Soviet biologist Vayncvayg (Weinzweig) in the field of power engineering systems composed of functional elements. Vaynovayg assumed that energy is delivered only in case of an exit signal of an element; in this case an energy evaluation of a system is performed. The function ε in case of unlimited increase of the argument was different from Shannon's function. He demonstrated that for some systems of functional elements the expression ε (n) < < Cn is valid, where C is a constant plus value. This assumption enables the realization of Bool function of a high number of arguments of rather complicated systems. It is probable that such a process takes place in the human brain. The author describes the practical use of cybernetics in investigation of the structure of languages and creation of artificial languages, i.e., conventional logical mathematical languages, chemical-formula lagnuages, etc. Recently, an international algorythmical language, called "algol", for formulation of problems for computers was introduced. A.A. Lupanov worked out an operational language for programming of such problems. The mathematical linguistic which is a part of cybernetics was recently investigated by the Soviet scientists Kulagin and Dobrushin. Investigations on mechanical translations were performed in the USSR by Kulagin and Moloshny. Automatic programming based on Soviet results was developed by L.B. Kantorovich, A.P. Jershov and others. The Soviet scientist Mielchuk

Development of cybernetics in the Soviet Union P/021/61/000/002/001/001 A107/A126

developed methods for translation of various languages into Russian. A team of scientists in Leningrad works on algorythms for translation into Indonesian, Burman, Vietnam and Suahely languages and vice versa. For this purpose an intermediate language was worked out. Similar investigations were performed in Kiyev, Tbilisi and Yerevan. The Soviet scientist L.V. Kantorovich works since 1930 on the development of mathematical methods for the solution of economical problems based on cybernetics. Based on this method, Leontiyev developed in the USA a method of linear programming for planning in economy. The Soviet scientist A.M. Giman developed a practical method for designing metal shaping machines by use of programming computers. The Soviet scientists Breyelo, Gurfinkel, Kobrinskiy, Sysin, Getlin and Jakobson investigated the problem of muscle currents, which permits the production of protheses steered by current and moved by outside motors enabling the invalid to express only the wish of a particular move, whereby the necessary energy is rendered and conducted by the proper muscles. The Soviet mathematician M.M. Gelfand investigated recently the activity of the heart based on cybernetics. There is 1 figure.

ASSOCIATION: Department of Logical Mathematics, Moscow University im. Lomonosov; Academy of Sciences USSR

MARKOV, Andrey A.

"On Computable invariants"
To be presented at the IMU International Congress of Mathematicians 1962 - Stockholm, Sweden, 15-22 Aug 62

Corresponding Member, Acad. of Sci. USSR; Mathematics Inst. imeni V. A. Steklov, Acad. of Sci. USSR (1961 position)

ARZUMANYAN, A.A., akademik; BERG, A.I., akademik; ZHUKOV, Ye.M., akademik; SEMENOV, N.N., akademik; VINOGRADOV, V.V., akademik; FRANTSEV, Yu.P.; SHCHERBAKOV, D.I., akademik; ANISIMOV, I.I.; GATOVSKIY, L.M.; IOVCHUK, M.T.; FEDOSEYEV, P.N., akademik; ROMASHKIN, P.S.; KONSTANTINOV, F.V.; MITIN, M.B., akademik; YELYUTIN, V.P.; PLOTNIKOV, K.N.; PRUDENSKIY, G.A.; YUDIN, P.F., akademik; RYBAKOV, B.A., akademik; KONSTANTINOV, B.P., akademik; KHVOSTOV, V.M.; KEDROV, B.M.; MARKOV, A.A.; BAISHEV, S.B., akademik; ALEKSEYEV, M.N., prof.; SKAZKIN, S.D., akademik; ALEKSANDROV, A.D.; POSPELOV, P.N., akademik

Discussion of L.F. Il'ichev's rreport. Vest. AN SSSR 32 no.12:19-50 D '62. (MIRA 15:12)

1. Chleny-korrespondenty AN SSSR (for Aleksandrov, Frantsev, Anisimov, Gatovskiy, Iovchuk, Romashkin, Konstantinov, Yelyutin, Plotnikov, Prudenskiy, Khvostov, Kedrov, Markov). 2. AN Kazakhskoy SSR (for Baishev).

(Research)

S/582/62/000/008/004/013
D405/D301

AUTHOR: Markov, A. A. (Moscow)

TITLE: On minimal contact-rectifier two-terminal networks for monotonic symmetrical functions

SOURCE: Problemy kibernetiki. no. 8. Moscow, 1962, 117-121

TEXT: The problem of constructing a minimal positive two-terminal network is solved for monotonic symmetrical functions, the solution being feasible in practice for a sufficiently large number of arguments. The two-terminal network which realizes the given monotonic symmetrical function $s_n^k(x_1,\ldots,x_n)$ is equal to unity if and only if not less than k of its arguments assume the value 1. Theorem: Any positive two-terminal network which realizes the function s_n^k contains not less than $k(n - k + 1)$ contacts ($1 \leqslant k \leqslant n$). This theorem is proved by utilizing the concepts of "length" and "width" of a two-terminal network, introduced by Moore and Shannon (see reference). The proof is based on 3 lemmas. Lemma 3: The number of

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APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032420014-4"

S/582/62/000/008/004/013
D405/D301

On minimal contact- ...

contacts in a positive two-terminal network is not less than the product of its length by its width. This lemma was proved by Moore and Shannon for a network without rectifiers; the author shows that the presence of rectifiers does not affect the validity of the lemma. By setting $k = \left[\frac{n+1}{2}\right]$, it is found that the minimal positive two-terminal network for the function $s_n^{\left[\frac{n+1}{2}\right]}$ contains $\frac{n+1}{2}(n + 1 - \frac{n+1}{2})$ contacts. Thus, for even n the minimal positive network for the function $s_n^{\frac{n}{2}}$ contains $\frac{n}{2}(\frac{n}{2}+1)$ contacts and for odd n it contains $(\frac{n+1}{2})^2$ contacts (for the function $s_n^{\frac{n+1}{2}}$). There is 1 figure.

SUBMITTED: October 18, 1961

Card 2/2

MARKOV, A.A.

Constructive mathematics. Trudy Mat.inst. 67:8-14 '62.
(MIRA 16:2)

(Mathematical analysis)

MARKOV, A.A.

On computable invariants. Dokl. AN SSSR 146 no.5:1017-1020 O '62.
(MIRA 15:10)

1. Matematicheskiy institut im. V.A.Steklova AN SSSR. Chlen-korrespondent AN SSSR.
(Invariants)

MARKOV, Andrey Andreyevich, prof.

Constructive mathematics. Fiz mat spisanie BAN 6 no. 2: 129-136 '63.

1. Moskovski durzhaven universitet, rukovoditel na katedrata po matematicheska logika.

16.7000

S/038/63/027/001/003/004
B112/B186

AUTHOR: Markov, A. A.

TITLE: Certain algorithms connected with systems of words

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya matematicheskaya, v. 27, no. 1, 1963, 101-160

TEXT: Systems of words in a given alphabet A may be regarded as words in an alphabet obtained from A by adding a new letter which acts as a separation mark (see A.A. Markov, Teoriya algorifmov (Theory of algorithms), Trudy Mat. in-ta im. V. A. Steklova Ak. nauk SSSR, 42, 1954). In the present paper certain concepts and normal algorithms are considered which are connected with systems of words capable of the above interpretation. The paper has the character of an auxiliary work for further investigations.

B

SUBMITTED: May 22, 1962

Card 1/1