KHARKEVICH A. A. PA 194T93

USSR/Physics - Resonators Aug 51

"Analysis of Impulses by Means of Resonators,"
A. A. Kharkevich

"Zhur Tekh Fiz" Vol XXI, No 8, pp 886-891

Subject analyzers were applied to periodic phenomena. Recently they were applied to nonperiodic phenomena, like impulses. Author shows that under certain conditions resonators may give without extinction discrete values of spectral density of an impulse. Submitted 31 Jan 51.

194T93

KHARKEVICH, A A

Spektry i Analiz. Izd. 2., Ispr. i Dop. Moskva, Gostekhizdat, 1953.
215 p. Diagrs., graphs
Bibliography: p. 214-215.

KHARKEVICH, A. A.

AID 249 - II

PHASE II TREASURE ISLAND BIBLIOGRAPHICAL REPORT

Call No.: AF594622

BOOK
Author: KHARKEVICH, A. A.
Full Title: SELF-EXCITED OSCILLATIONS
Transliterated Title: Avtokolebaniya

Publishing Data
Originating Agency: None
Publishing House: State Publishing House of Technical and Theoretical Literature
No. of copies: 10,000
Date: 1953
No. pp.: 170
Editorial Staff: None

Text Data
Coverage: This book describes physical aspects of self-excited oscillations. The study is conducted without mathematical analysis and is based on energy correlations. A large number of examples of self-excited oscillations in physics and engineering has been analysed.
Preface: The leading role of the Soviet science in the field of non-linear oscillation, and particularly in self-excited oscillations, is generally well known. Books like Theory of Oscillations, by A. A. Andronov and S. E. Khaykin, Self-Excited Oscillating Systems, by K. F. Teodorchik and others are excellent and exceptional in this field. The present small book may prove to be of value because it

USSR/Electronics - Information Theory FD-1464

Card 1/1 : Pub. 90-1/14

Author : Kharkevich, A. A.

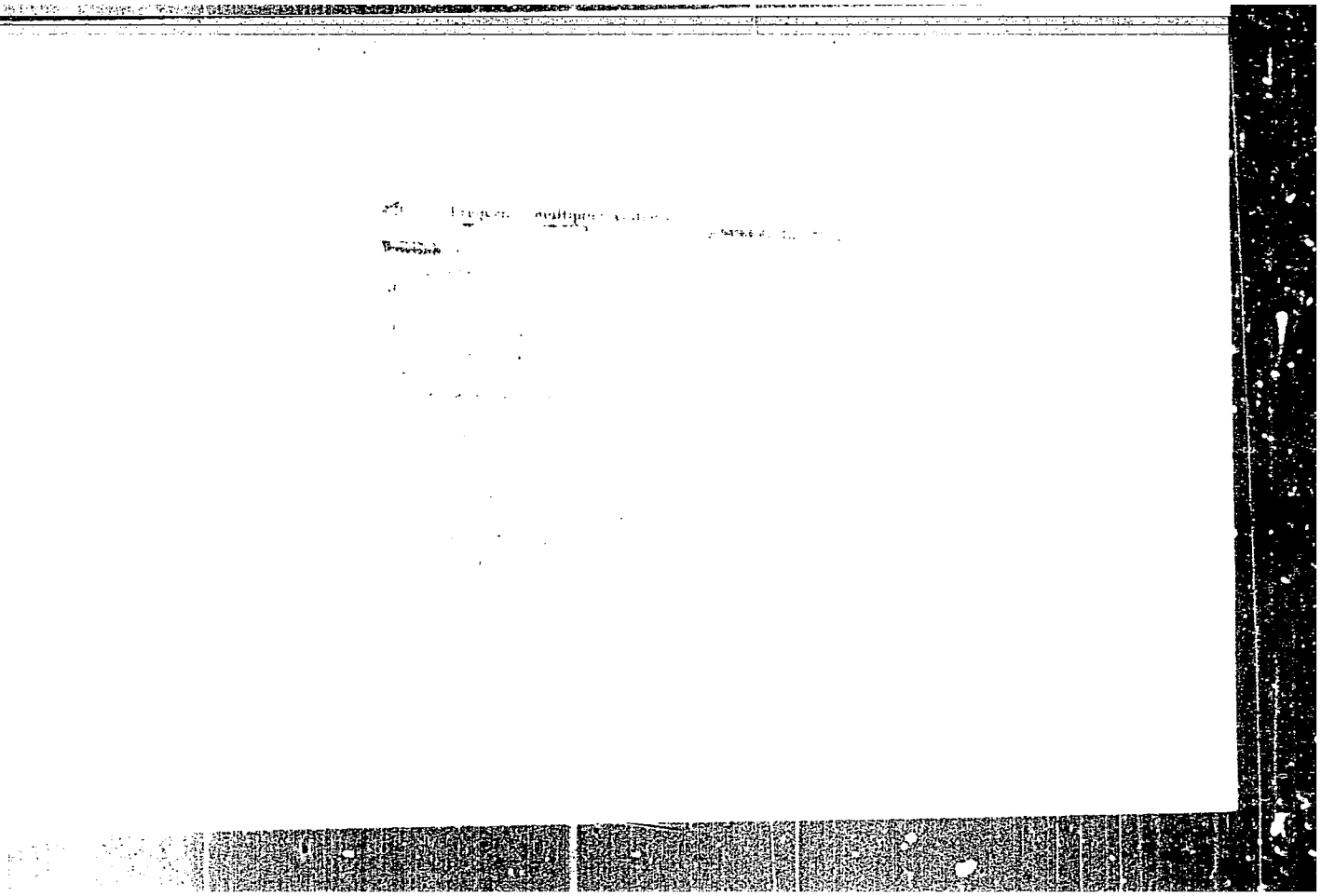
Title : Main outline of the general communication theory

Periodical : Radiotekhnika 9, 3-7, Sep/Oct 1954

Abstract : The author outlines the development of the communication or information theory, starting with Hartley's work (1928) on the notion of the content of a message, down through Shannon's formulation of the comprehensive theory. He discusses V. A. Kotel'nikov's theorem (1933) enabling the translation of any type of message (continuous or in discrete units) into the transmission of discrete numbers at a definite rate, the compromise between economy of units and the need for error correction, the correlation method of reception, D. V. Ageyev's theorem (1935) of signal separation, and problems of methods. He states that Soviet scientists should reject "cybernetic philosophy" but not "cybernetic techniques." Four references: 3 USSR (1933, 1935, 1946). (Article is the author's abstract of a paper he delivered at a city-wide meeting of members of the All-Union Scientific and Technical Society of Radio Engineering and Electric Communications imeni A. S. Popov [VNORiE] at Moscow on April 26, 1954).

Institution :

Submitted :



APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000721820011-9"

KAZARYAN, Rafael' Avetisovich; KUVSHINOV, Boris Ivanovich; KHARKEVICH, A.A., redaktor; ANDREYENKO, Z.D., redaktor; KHELEMSKAYA, L.M., tekhnicheskiy redaktor

[Transmission of messages through the communication system] Peredacha soobshchenii po sistemam sviazi. Moskva, Gos.izd-vo litry po voprosam sviazi i radio, 1955. 41 p. (MLRA 9:2)
(Telecommunication)

KHARKEVICH, Aleksandr Aleksandrovich; KARASEV, M.D. redaktor; MURASHOVA, N. Ya., tekhnicheskiy redaktor

[Outline of a general theory of communication] Ocherki obshchei teorii sviazi. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1955. 268 p. (MLRA 8:8)

(Information theory)

USSR/Electronics - Information Theory FD-2928

Card 1/1 Pub. 41-9/17

Author : Blokh, E. L. and Kharkevich, A. A., Moscow

Title : Geometric presentations in the theory of communications

Periodical : Izv. AN SSSR, Otd. Tekh. Nauk 6, 91-100, June 1955

Abstract : Describes how and where geometric theory can be applied to the study and the science of communications. Discusses the incidental vector, the message and the signal, the signal and interference, interference rejection, transmission capacity, maximum transmission capacity, method of storage and the separation of signals. Diagrams, formulae. Seven references, 4 USSR.

Institution :

Submitted : April 14, 1955

USSR/Electronics - Information Theory FD-2669

Card 1/1 Pub. 90-1/12

Author : Blokh, E. L. and Kharkevich, A. A.

Title : Geometric theory of the threshold of transmission capacity of a communications system

Periodical : Radiotekhnika, 10, 3-7, Jul 55

Abstract : The limiting factors of signal transmission in a communications system are evaluated on the basis of the geometric theory. The limiting transmission capacity of a system is defined as the greatest amount of intelligence that can be conveyed to the receiving end of the line, maintaining the lowest desired probability of error. The transmission capacity approaches zero as the level of noise approaches that of the signal. Reliable reception for small increments of signal over noise require the use of special methods of reception, such as storage and correlation methods. Graphs. Two references; one USSR.

Institution :

Submitted : January 11, 1955

KHARKEVICH, A. A.

KHURGIN, Ya.I.

"Spectra and analysis." A. A. Kharkevich. Reviewed by IA. I. Khurgin. Usp.mat.nauk. 10 no.1:239-242 '55 (MLRA 8:6)
(Spectrum analysis)(Mathematical physics)

Kharkevich, A.A.

USSR/Electronics -- Communication Theory FD - 1933

Card 1/1 Pub 90-2/9

Author : Kharkevich, A. A., and Blokh, E. L.

Title : Limiting capacity of a communication system

Periodical : Radiotekhnika 10, 14-20, Feb 1955

Abstract : The derivation of an expression based on geometrical relationships for determining the limiting capacity of a communication system is given. The older, well-known Shannon formula generally used for these calculations holds true only when the signal-to-noise ratio approaches infinity.

Institution: --

Submitted : December 15, 1954

Kharkevich, A.A.

BLOKH, E.L.;KHARKEVICH, A.A.

Reply to L.M.Fink's remarks. Radiotekhnika 10 no.10:75 O '55.
(Telecommunication) (MLRA 9:1)

KHARKEVICH, Aleksandr Aleksandrovich; KOSTIYENKO, A.I., redaktor; TUMARKINA, N.A., tekhnicheskiy redaktor

[Nonlinear and parametric phenomena in radio engineering] Nelineinye i parametricheskie iavleniia v radiotekhnike. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1956. 184 p. (MLRA 10:1)
(Radio circuits)

KHARKEVICH, A. A., (Prof.)

"Questions of the Theory of Information in Systems of Automatic Regulation, Telecontrol and Telemetering,"

paper read at the Session of the Acad. Sci. USSR, on Scientific Problems of Automatic Production, 15-20 October 1956.
Avtomatika i telemekhanika, No. 2, p. 182-192, 1957.

9015229

KHARKEVICH, A.A., doktor tekhnicheskikh nauk.

On the best code. Elektrosviaz' 10 no.2:65-70 F '56.(MLRA 9:6)
(Cipher and telegraph codes)

KHARKEVICH, A.A.

On the theory of an ideal receiver. Elektrosviaz' 10 no.4:28-34 Ap '56. (Radio--Receivers and reception) (MLRA 9:7)

KHARKEVICH, A A.

SUBJECT USSR / PHYSICS CARD 1 / 3 PA - 1705
AUTHOR BLOH,E.L., HARKEVIC,A.A.
TITLE On the Question of the Geometric Proof of SHANNON'S Theorem.
PERIODICAL Radiotechnika, 11, fasc. 11, 5-16 (1956)
Issued: 12 / 1956

In the course of previous works (Radiotechnika, fasc.2 and 7, 1955) the authors endeavored to prove the theorem on the penetrability limit geometrically. According to SHANNON this theorem is: $C = F \log_2 \frac{P + P_\Pi}{P_\Pi}$

P here denotes the average power of the transmitter, P_Π - the power of the perturbation in the stripe F, C - velocity. In the present work the theorem is presented in SHANNON'S form and also geometric proof of the second statement made in this theorem. It was found that SHANNON failed to take the following into account: Even in the case of the densest arrangement the coefficient of the filling up of the space by non-intersecting spheres is diminished if $n = 2FT$ (T - time, n - dimension) increases, and at $n \to \infty$ it tends towards zero. The authors corrected this error committed by SHANNON and obtained an expression which deviates from that of SHANNON: $C \leq F \left[\log \left(1 + \frac{P}{P_\Pi}\right) - 1\right]$ The difference between the two formulae is very essential in the case of comparable P and P_Π, namely just in the case of such conditions as are of particular interest in modern radiotechnology. On the other hand, SHANNON'S formula has been generally accepted. This contradiction could be explained by

Radiotechnika, 11, fasc. 11, 5-16 (1956) CARD 3 / 3 PA - 1705

authors regret not being in possession of this proof. It would be of importance because then not only SHANNON'S theorem could have been proved gecmetrically, but it would have been possible to show whether the limit of penetrability can be realized by means of a receiver that is ideal in KOTELJNIKOV'S sense.

INSTITUTION:

KHARKEVICH, Aleksandr Aleksandrovich

KHARKEVICH, Aleksandr Aleksandrovich; KOSTIYENKO, A.I., red.; GAVRILOV, S.S., tekhn.red.

[Spectra and analysis] Spektry i analiz. Izd. 3-e, perer. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1957. 236 p. (MIRA 11:2)
(Spectrum analysis)

KAZARYAN, Rafael' Avetisovich; KUVSHINOV, Boris Ivanovich; NAZAROV, Mikhail Vasil'yevich, BERG, A.I., redaktor; DZHIGIT, I.S., redaktor; KULIKOVSKIY, A.A., redaktor; SMIRNOV, A.D., redaktor; TARASOV, F.I., redaktor; TRAMM, B.F., redaktor; CHECHIK, P.O., redaktor; SHAMSHUR, V.I., redaktor; KHARKEVICH, A.A., redaktor; MEDVEDEV, L. Ya., tekhnicheskiy redaktor

[Elements of the general theory of communications] Elementy obshchei teorii sviazi. Moskva, Gos. energ. izd-vo, 1957. 94 p. (Massovaia radiobiblioteka, no.263) (MLRA 10:4)
(Telecommonication)

Kharkevich A.A.

PHASE I BOOK EXPLOITATION 476

Kharkevich, Aleksandr Aleksandrovich

Teoreticheskiye osnovy radiosvyazi (Theoretical Bases of Radio Communication) Moscow, Gostekhizdat, 1957. 347 p., 25,000 copies printed.

Ed.: Kostiyenko, A.I.; Tech. Ed.: Gavrilov, S.S.

PURPOSE: This monograph is addressed to third-year students in radio communication engineering institutes.

COVERAGE: The material presented in the book constitutes a course designed to provide the students with the fundamentals of radio theory and technique as applied to all subsequent disciplines in radio engineering, such as receivers, amplifiers, transmitters, radio broadcasting, television, etc. Practical problems of radio engineering are not treated in the present work. The circuit diagrams, and certain structural presentations, therefore, are given only as illustrations of general principles. The material presented in this book differs from the preceding course on the

Card 1/7

fundamentals of radio engineering in that it contains a special section on the fundamentals of radio communication. Some of the classical material (the section on the theory of circuits, for example) has been eliminated from the present work to make room for new material. The course of study presented in this monograph corresponds on the whole, to the program adopted at the 1953 Conference of Representatives of the Moscow, Leningrad and Odessa Institutes and later confirmed by the Administration of Schools of the Ministry of Communications in August,1955. This course of study consists of three parts, the first two of which are embodied in the present work. The third part of the course was published in 1956 as a separate book by the same author. There are no references.

TABLE OF CONTENTS:

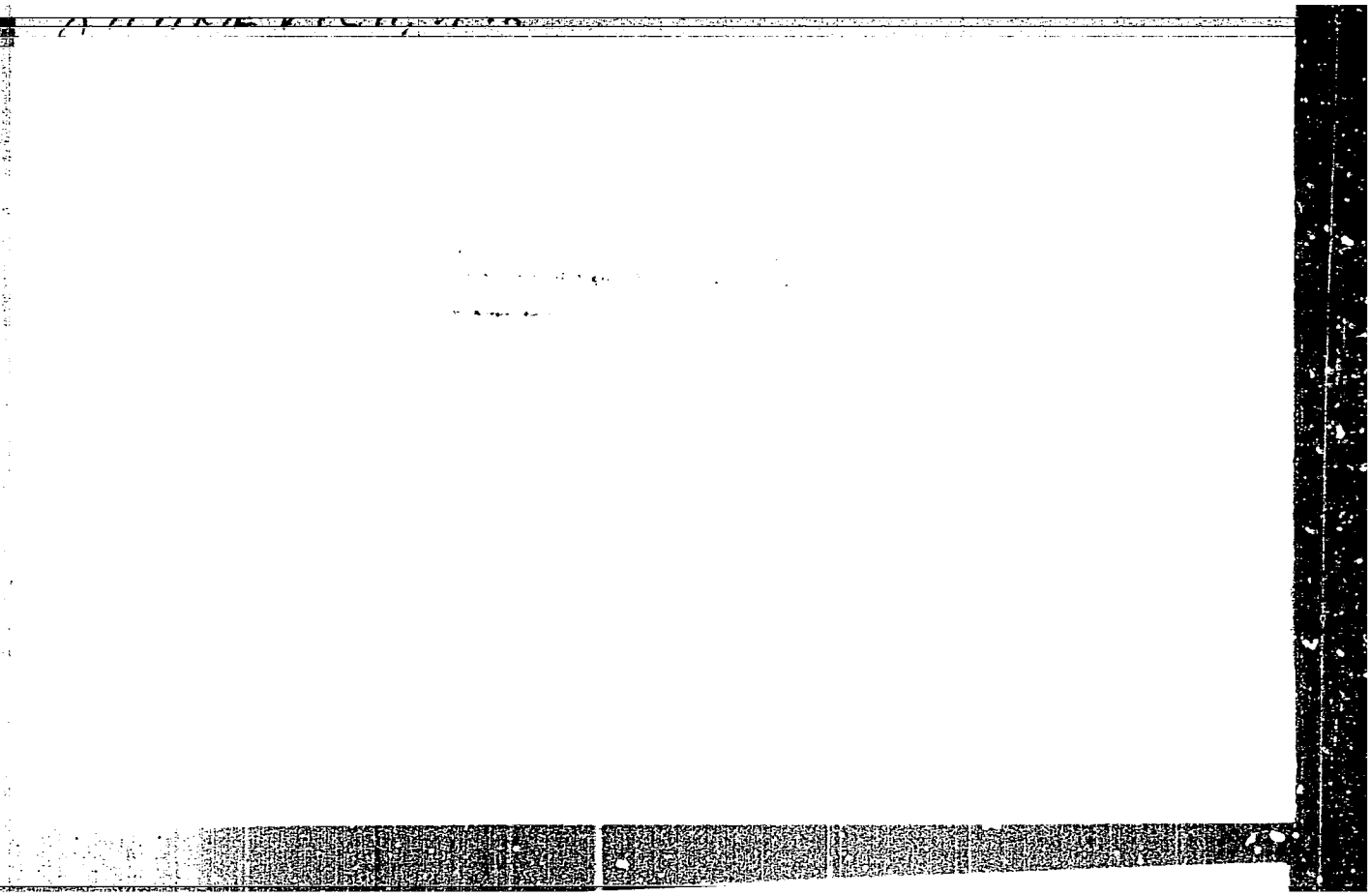
Card 3/7

Card 4/7

AVAILABLE: Library of Congress

JJP/ksv
8-4-58

Card 7/7



AUTHOR: Kharkevich, A.A.

TITLE: Possibility of signal spectrum compression. (O vozmozhnostyakh szhatiya spektra signala).

PERIODICAL: "Elektrosvyaz'" (Telecommunications), 1957, No.4, April, pp.3-11 (U.S.S.R.)

ABSTRACT: The purpose of the present article is to clarify at least a few of the basic assumptions underlying the problem of signal frequency spectrum compression. This problem has lately been given much attention but most works bear more onto the practical rather than the theoretical side of it. The author begins with general considerations governing the input and output signals, the amount of information and with the theorem of conservation of information. The non-statistical possibility of spectrum compression is next considered and two examples of spectrum compression of the signal with information:

$$I = 2FT \log m$$

are given, where F is the spectrum bandwidth, T is the duration of the signal, Δt - the interval between symbols, expressed by the Kotelnikov theorem as $\Delta t = \frac{1}{2F}$ and m is the equiprobable value of the quantised signal x(t). The author then proceeds to consider theoretically the possibility of spectrum compression by changing the signal statistics. He establishes that F

may be compressed, for a given constant T, by increasing the entropy I'; this would lead to the elimination of internal correlations, which in turn, would equalize the probability of independence of separate symbols. Since the internal statistical correlation decreases the entropy and since then, for transmission of a given information, a signal with a large FT product is needed, this leads to redundancy R. Two formulae for R are considered:

$$R = 1 - \frac{I'}{I'_0}$$

where $I'_0 = \log m$ and

$$R = 1 - \frac{F_0 T_0}{FT}$$

where F and T are actual spectrum bandwidth and duration of the signal and F_0 and T_0 - are same but for the signal with the same information but for maximum value of $I' = I'_0$. The redundancy of AM and FM signals is next considered. The redundancy R for AM is being shown to be 0.5 and for FM to be 0.97 (in both cases they are eliminated eventually by detection. The author also mentions that the reduction of noise interference in FM signals, due to the increase in

KHAR'KEVICH, A.A.

INFORMATION THEORY

"On the Theoretical Optimum Communication System" by A.A. Khar'kevich, Elektrosvyaz', No 5, May 1957, pp 15-18.

From the theoretical point of view, the choice of a communication system reduces to the choice of a method of transmission (i.e., code), and of a method of reception. An optimum system should give the best reproducibility for a specified noise rejection, or conversely, the best noise rejection for a specified reproducibility.

It is shown that obtaining the optimum system reduces to a certain variational problem, the formulation of which contains the noise-distribution probability. The statement of the problem is illustrated with several examples.

Card 1/1 - 8 -

KHARKEVICH, A.A.

SUBJECT USSR/MATHEMATICS/Geometry CARD 1/1 PG - 832
AUTHOR CHARKEVIČ A.A.
TITLE A problem.
PERIODICAL Uspechi mat.Nauk 12, 2, 184 (1957)
reviewed 6/1957

The author gives the following problem:
Determine the number of corners of a more-dimensional cube the distances of which from a given corner and one to another are not smaller than a given magnitude.

SOV/108-58-5-7/13

AUTHOR: Kharkevich, A.A.

TITLE: ~~A Comparison~~ of Several Possibilities in Sending Simple Pictures (Sravneniye nekotorykh vozmozhnostey peredachi prostykh risunkov)

PERIODICAL: Elektrosvyaz', 1958, Nr 5, pp 44 - 47 (USSR)

ABSTRACT: The previous work of Shannon, Loeb and Benjamin is mentioned. Conventional methods of sending simple line drawings are inefficient since the area covered by the lines of the drawing is a minute fraction of the total area of the figure. Two suggestions are examined: in one, the co-ordinates of several points in the course of the lines are transmitted; in the other, the scanning is carried out along the actual lines themselves. The improvement factor (ratio of signal volumes in conventional and proposed methods) for each case is given in Eq.(1) and (2), respectively. In order to compare the two systems, it is assumed, intuitively, that the number of symbols transmitted is linearly related to the total length of line in the drawing. The second system is more effective than the first by a factor approximately equal to (LogH)/3. The first method makes inadequate use of the statistics of the message but the second encounters particular difficulties in accomplishment,

Card 1/2

SOV/108-58-5-7/13

Comparison of Several Possibilities in Sending Simple Pictures

If the drawing does not consist of a continuous line, it must either be so prepared or scrutinised with a rather complicated equipment including information storage capacity. On the other hand, the first method can be made more effective by repeated transmission with a different direction of scan, or by first storing the information and then releasing it at a rate which makes better use of the channel capacity. The second method may also be improved by making use of higher order probabilities, for example, that the number and kind of changes in direction that the line may make is in many cases very restricted. There are 3 figures and 2 references, 1 of which is Soviet and 1 English.

SUBMITTED: February 24, 1958

Card 2/2

SOV/106-58-11-1/12

AUTHOR: Kharkevich, A. A.

TITLE: The Possibilities of Spectrum Compression (O vozmozhnostyakh szhatiya spektra)

PERIODICAL: Elektrosvyaz', 1958, Nr.11, pp.3-8 (USSR)

ABSTRACT: At the present time the problem of spectrum compression has still not been completely solved due mainly to theoretical difficulties. There is however one class of process about which one can say something rather definite and which may be useful for the further development of theory and technology. This is the class of modulation processes. In human speech sub-carriers are formed both by the expulsion of air from the throat and by the vibration of the vocal cords. These carriers then support quite narrow-band modulation spectra. In the system of transmission considered the original spectrum is analysed by a bank of narrow-band filters whose outputs change slowly with time. Eq.(4) gives the instantaneous spectrum from a typical filter. At the receiving end, for reconstituting the original process, a noise generator feeds a bank of

Card 1/2

filters and a system of amplitude modulators which control the strength of the outputs from each filter. A further simplification is possible if we replace the noise-fed narrow-band filter by a simple sine-wave oscillator. The problem now reduces to the transmission of amplitude and instantaneous-phase modulating functions. It is concluded that the use of simple sinusoidal signals for reconstituting speech is quite inadequate, and this is borne out by the experiments of Marku and Dage (Ref.6). There are 6 references, of which 4 are Soviet, 1 English and 1 German.

SUBMITTED: June 30, 1958.

Card 2/2

AUTHOR: Kharkevich, A. A. SOV/108-13-8-1/12

TITLE: On the Kotel'nikov Theorem (O teoreme Kotel'nikova) Survey of Some of the Latest Papers (Obzor nekotorykh noveyshikh rabot)

PERIODICAL: Radiotekhnika, 1958, Vol. 13, Nr 8, pp. 3 - 10 (USSR)

ABSTRACT: The Kotel'nikov theorem (abroad it is called the sampling theorem) dating from 1933 is the basis of all pulse signaling systems. As accurate relation it is only valid for functions the spectral density of which is equal to zero for all frequencies outside a certain finite interval, the spectrum width. The transmission function, however, represents a random process; a random process the spectral density of which is equal to zero in the finite interval is a singular process, i.e. the process values can be predicted with any accuracy for any time. This again means that processes with strictly limited spectrum can not transmit informations, i.e. that no process representing a signal can have a finite spectrum.- For this reason some papers were published in 1956-1957 which dealt with Kotel'nikov's theorem. It would be the most natural thing to regard the theorem not as an exact statement referring to a function with

Card 1/3

finite spectrum but as an approximate assertion referring to a function with an infinite spectrum. This opinion is uttered in the paper by I.T.Turbovich (Ref 3). The evaluations of the error by the approximation (Refs 3 and 4) agree with each other. In the paper by Zheleznov (Ref 5) a more generalized problem is posed from the very beginning: the best representation of the random function $u(t)$ by an expansion according to the method used in formula (10) is to be found. In the AIM-scheme a physically similar expansion is realized. It reads: continuous quasisteady signals $u(t)$ with an infinite spectrum can be transmitted by means of figures following one another every τ_1-seconds with an accuracy arbitrarily close to the final accurracy ν_0, when the period τ_1 does not exceed the correlation interval τ_0 and the signal duration T is much longer than the correlation interval τ_0. This formulation comprises the results of all papers. Only the theoretical information content of the Kotel'nikov theorem remained uninvestigated. This gap was closed by the lecture delivered by Kolmogorov (Ref 6).

On the Kotel'nikov Theorem. Survey of Some of the Latest Papers 108-13-8-1/12

Concluding the author states that the Kotel'nikov theorem is at present regarded as an approximate (and not accurate) assertion, and that it makes possible the following statement: 1) An approximation formula for the process in the form of a series of lagging functions, and 2) to give an approximate evaluation of the number of measurements of the random vector proceeding from the desired accuracy in the determination of the ε-entropy. There are 1 figure, and 6 references, which are Soviet.

SUBMITTED: February 24, 1958

1. Radio signals--Theory 2. Scientific reports

Card 3/3

AUTHOR: Kharkevich, A. A. SOV/108-13-9-14/26

TITLE: Letter to the Editor (Pis'mo v redaktsiyu)

PERIODICAL: Radiotekhnika, 1958, Vol. 13, Nr 9, pp. 69 - 69 (USSR)

ABSTRACT: This letter suggests the compilation of an atlas of typical pulse generating circuits. First the ordinary block diagrams of various complicated devices are listed. Then the principal circuit diagrams are compiled. This is where this atlas would be of great help. This atlas should contain a complete presentation of the most modern circuit diagrams of individual blocks, which have been examined and which already have stood their test. Only a minimum number of variants should be incorporated, giving technical information and data on well established modes of operation. The next stride in this direction would be the industrial production of types of circuit elements. Elements for such a rationalization are already in existence in the USSR and abroad.

Card 1/1

KHARKEVICH, Aleksandr Aleksandrovich, red.; RAYEVSKIY, S.Ya., red.; AKHLAMOV, S.N., tekhn.red.

[Information theory and its applications; collection of translations from the English] Teoriia informatsii i ee prilozheniia; sbornik perevodov. Pod red. Kharkevicha. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1959. 328 p. (MIRA 12:12)
(Information theory)

SOV/106-59-5-11/13

AUTHOR: Kharkevich, A.

TITLE: Letter to the Editor: Photo-Telegraphy from the Point of View of Telegraphy (Fototelegraf s tochki zreniya telegrafa)

PERIODICAL: Elektrosvyaz', 1959, Nr 5, pp 73-76 (USSR)

ABSTRACT: The object of this letter is to compare the potentialities of black-white photo-telegraphy with normal telegraphy for transmitting written information. It is shown that telegraphy is more efficient than photo-telegraphy. For the purposes of comparison, the original information is assumed to be in the form of type letters situated in rectangles of 1.5 x 2 mm dimensions. If the resolution of the photo-telegraphic apparatus is such that the finest detail is a 0.2 mm square, then the number of elementary squares per letter is 75, requiring 75 binary digits (current pulse (1) for black; no-pulse (0) for white) per letter. However, it cannot be concluded that the Baudot code which uses 5 digits per letter is therefore 15 times more efficient than the photo-telegraphic method, since photo-telegraphy has greater

Letter to the Editor: Photo-Telegraphy from the Point of View of Telegraphy

interference-stability. For true comparison, it is necessary to reduce both systems to a common condition of interference-stability. The author considers the construction of letters from a grid containing $3 \times 4 = 12$ elementary squares. [This number is not sufficient for all the letters of the Russian alphabet but this is not important for the author's argument.] Letters with the simplest forms, constructed in this manner, are shown in Fig 1. Due to interference, errors arise in which a no-pulse digit is replaced by a pulse digit (or vice versa). This is called a single error. If two digits are incorrect, it is called a double error and so on. The smaller the probability of replacement of one letter by another, the greater the interference-stability of the system and, in its turn, this probability is smaller, the more the letters differ from one another. This probability can therefore be qualitatively expressed by the number of different digits in the different letters. The number of

Letter to the Editor: Photo-Telegraphy from the Point of View of Telegraphy

different digits is called the spacing. The spacing between the different letters is not constant, the spacing between the seven simplest letters considered being shown in Table 1. Letters having the greatest spacing with respect to the others, e.g. the letter T, are the most stable. However, the spacing alone is not sufficient; two different letters can differ from a third by the same spacing, the difference lying in the "direction" of the elementary squares, i.e. on the direction of the scan. If the black elements are denoted by 1 and the white by 0 and the scan of the letter rectangle is as shown in Fig 4, then a 12 digit binary code, as shown in Table 2, is obtained. The spacing increases with the number of digits, thereby increasing the interference-stability but decreasing the efficiency of the transmission. It is possible to increase the spacing by departing from the normal letters and using new simplified configurations satisfying the demand for maximum spacing but this, in fact, is the

Letter to the Editor: Photo-Telegraphy from the Point of View of Telegraphy

principle of the telegraph system. The usual 5 digit Baudot code is next considered. The minimum spacing between two code combinations is unity. Thus, for a single error, a different letter is received and the error remains undetected. A simple error detecting code can be obtained by adding one more digit and making the number of 0's or 1's in any code combination an even number. The least spacing is then two and this code with 6 digits is as effective as the 12 digit photo-telegraphic code considered earlier. Using the same scan sequence as shown in Fig 4, "images" of the letters can be constructed. The resulting images are shown in Fig 5 and the letter spacings are tabulated in Table 5. Comparison of Tables 1 and 5 and of the images permits direct comparison of the telegraph and photo-telegraph systems. Table 5 shows the spacing of the telegraph system to be equal to, or relatively better than, the spacing of the photo-telegraphic system (which refers to a 12 digit code). It is concluded that

Letter to the Editor: Photo-Telegraphy from the Point of View of Telegraphy

in telegraphy an optimum code can be chosen independently, whereas in photo-telegraphy simplification of the letter forms leads to longer code combinations for the same interference stability and hence to less efficiency compared to the telegraphic system.

SUBMITTED: 19th January 1959

Kharkevich, A.A.

PHASE I BOOK EXPLOITATION SOV/4279

Problemy kibernetiki, vyp. 4 (Problems of Cybernetics, no. 4) Moscow, Fizmatgiz, 1960. 257 p. 10,000 copies printed.

Compilers: G.V. Vakulovskaya, T.L. Gavrilova, B.Yu. Pil'chak, Ya.I. Starobogatov, V.S. Shtarkman, and S.V. Yablonskiy; Eds.: G.V. Vakulovskaya, Ya.I. Starobogatov, and B.I. Pinikov; Tech. Ed.: S.N. Akhlamov; Chief Ed.: A.A. Lyapunov.

PURPOSE: This book is intended for mathematicians and scientists interested in the problems of cybernetics and systems control.

COVERAGE: The book is a collection of articles on cybernetics, the theory of control systems, information theory, programming, computers, control processes in living organisms, and mathematical linguistics. The author thanks the following persons for their assistance: V. Ya. Vetukhnovskiy, A.P. Yershov, V.M. Zolotarev, V.K. Korobkov, V.I. Levenshteyn, O.B. Lupanov, B.A. Sevast'yanov, and M.L. Tsetlin. References accompany several of the articles.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

Card 5/5

AC/pw/mas
10-3-60

24846 S/106/60/000/004/001/007
A055/A133

6.9500

AUTHORS: Blokh, E. L., and Kharkevich, A. A.

TITLE: Antifading coding

PERIODICAL: Elektrosvyaz', no. 4, 1960, 3 - 6

TEXT: A method of signal transmission is described, using correcting anti-interference codes and allowing to enhance the reliability of communications in the presence of fading. Assuming that the transmitted communication is coded by n-digit combinations of a uniform code, a group of N such combinations is taken and written down as shown in Table 1, number N being chosen so that the time of transmission of N binary digits should be sufficiently long compared to the average duration of fading. Transmitting Table 1, not by columns, but by horizontal lines, a part of the transmitted signal will vanish owing to fading. Replacing the vanished digits by an asterisk, we obtain Table 2 for the received signal. If the received digits are now grouped according to columns, we obtain code combinations from which certain individual digits have vanished. If N - and this is the essential point - was chosen in conformity with the statistics of fading, the disappearance of an individual digit from the combination can be considered as

Card 1/5

24846 S/106/60/000/004/001/007
A055/A133

an independent event. The digits that vanished owing to fading are distributed in a random manner in code combinations. If each column contains one combination, the errors in the same positions in the adjacent combinations are strongly correlated. But if several combinations, representing a certain section of the communication, are placed in one column, the error can already be considered as independent, not only within the given combination, but also within the limits of the communication section. In the case of an additive interference, a certain digit is replaced by an erroneous one (e.g. 0 by 1 or vice versa). In the case of a multiplicative interference of the fading type, the digit is not replaced, but vanishes altogether. If not more than r vanished digits must be restored, it is sufficient to use the code with a distance between combinations at least equal to r + 1. Comparing the received combination with all possible ones, it can be seen that the received combination coincides with the transmitted one and differs from all other combinations in at least one digit. The transmitted combination can thus be identified and, consiquently, all the vanished digits can be restored. If the same code is used in the presence of an additive interference, it will merely allow to detect errors whose number does not exceed r; it will not allow to locate them, and their correction will thus be impossible. The interference-killing feature is characterized by the probability of an error-free reception of

Card 2/5

a sequence of L elements of the communication. The ratio ε between the duration of the vanishing of the signal and the total transmission duration can serve as the parameter determining the fading action. When no correcting code is used, the probability of error-free reception of a sequence of M digits is

$$p_1 = (1 - \varepsilon)^M ,$$

or, for $\varepsilon \ll 1$

$$p_1 \approx e^{-\varepsilon M} . \qquad (1)$$

When a code restoring not more than r digits in each n-digit code-combination is used, the probability of correct reception of each combination is

$$1 - C_n^{r+1}\varepsilon^{r+1}(1 - \varepsilon)^{n-r-1} - \ldots - \varepsilon^n$$

and the probability of error-free reception of the section of M digits of the initial sequence will be

$$p_2^{(r)} = \left[1 - \sum_{k=r+1}^{n} C_n^k \varepsilon^k (1 - \varepsilon)^{n-k}\right]^{\frac{M}{m}}$$

or, for $\varepsilon \ll 1$

$$p_2^{(r)} \approx e^{\frac{M}{m} C_n^{r+1} \varepsilon^{r+1}} \qquad (2)$$

Card 3/5

Antifading coding

In particular:

$$p_2^{(1)} \approx e^{-\frac{M}{m}\frac{n(n-1)}{2}\varepsilon^2} = e^{-M\frac{m+1}{2}\varepsilon^2}, \quad (3)$$

$$p_2^{(2)} \approx e^{-\frac{M}{m}\frac{n(n-1)(n-2)}{3!}\varepsilon^3}. \quad (4)$$

A comparison of (3) and (1) shows that the use of the code that restores one digit is expedient if:

$$\frac{m+1}{2}\varepsilon < 1.$$

A comparison of (3) and (4) shows that the code restoring two digits must be used only if:

$$\frac{n(n-1)(n-2)}{3m(m+1)}\varepsilon < 1.$$

There are 2 tables and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: Price, Green. "A communication technique for multipath channels". Proc. IRE., 46, no. 3, 1958.

SUBMITTED: November 24, 1959

Card 4/5

27633
S/194/61/000/002/013/039
D216/D302

16,6800 (1024, 1327, 1329 also 2709)

AUTHOR: Kharkevich, A.A.

TITLE: The value of information

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 2, 1961, 33, abstract 2 V252 (V sb. Probl. kibernetiki, no. 4, M., Fizmatgiz, 1960, 53-57)

TEXT: Information is usually collected for a certain specific purpose and it seems therefore logical to raise the question of the value of information as depending on how this information helps in obtaining this purpose. The same information may have different values, depending on the aim. Existing theory ignores the meaning of information and its value for the addressee. In the case when the aim - for the attaining of which the information is being collected - can be clearly determined, the value of the information can be determined as the increase in the probability of attaining the aim. If, up to the instant of receiving information, this

Card 1/2

27633
S/194/61/000/002/013/039
D216/D302

probability is p_o and after the arrival of information this probability became p_1, then the value of the received information can be determined as

$$\tilde{I} = \log_2 p_1 - \log_2 p_o = \log_2 \frac{p_1}{p_o}$$

It is shown in an example that the value of information can be negative when it decreases the probability of attaining the aim. It is suggested that it be called, in this case, disinformation. A few examples of evaluating the value of information are given. 2 references.

Card 2/2

KHARKEVICH, A.A.

In regard to professor M.S. Neiman's article. Izv. vys. ucheb. zav.; radiotekh. 3 no.4:519-520 Jl-Ag '60. (MIRA 13:10)

1. Moskovskiy elektrotekhnicheskiy institut svyazi.
(Radio--Study and teaching)

9.5000

77556
SOV/108-15-2-1/12

AUTHOR: Kharkevich, A. A.

TITLE: On Principles of Reading Machine Construction

PERIODICAL: Radiotekhnika, 1960, Vol 15, Nr 2, pp 3-9 (USSR)

ABSTRACT: The paper discusses some general problems of construction of reading machines. The definition of a reading machine is given as a machine which automatically recognizes letters, digits, or other signs of a printed or written text. Any reading machine has to perform the following basic operations: (a) presentation and examination; (b) preparation of description; and (c) comparison of the description with a standard, i.e., the proper recognition operation. The examination consists in the action of the presented pattern on a transducer, normally of the photoelectric type. Thereby a corresponding electric signal is produced. The description is the most important operation. It consists in forming a signal describing the pattern in a manner most convenient for recognition purposes.

Card 1/6

On Principles of Reading Machine Construction 77556
SOV/108-15-2-1/12

Operations (a) and (b) may be combined. The operation of recognition, in principle, does not present any difficulties. It is obvious that the reading machine must have some kind of memory in which the standard descriptions are stored. In a large group of reading machines the examination is made by scanning, whereby the reading follows a trajectory in the plane of the pattern. This trajectory is either continuous or composed of separate sections. The scanning signal may also be used for the description. It is important in this case that an optimal scanning selection be made. Two kinds of description are considered: (1) absolute description, permitting restoration of the described object with certain accuracy; (2) relative description, containing only the features by which a certain object differs from other objects of the same set. The latter description is sufficient for recognition purposes and is more economical. An optimum description should be the shortest possible, since a shorter description means a simpler machine. The author gives examples of minimization of description.

Card 2/6

He points out, however, that the problem of minimization of absolute as well as of relative descriptions is not only still unsolved, but has not even been sufficiently clearly formulated. The simplest scanning methods are in direct relation with a certain system of coordinates. The usual TV scanning, for example, is related to the rectangular system. There is a special type of scanning called follow-up scanning. Here, the scanning ray follows the contour of the pattern, and the curve itself is used as coordinate axis. One of the description methods consists in the use of the scanning signal for description. There is another method, called topological description. This method consists in counting the topological features of the pattern. Topological description has a rather general character. However, it is not sufficient for the recognition of letters and digits which are topologically identical, e.g., 6 and 9. Therefore, some elements of geometrical description must be added. Since letters and digits of various forms and sizes must be recognized, the problem

of invariability of description with respect to transformations is of great importance. It is stated that from a practical point of view follow-up scanning is an important description method, because it does not vary with respect to the actually occurring transformations. Topological description also does not vary. However, its technique is still complex. The recognition may be an operation simultaneous or stepped-up. When the patterns to be recognized are characterized by n features of which any may be either present or absent, then the description of a pattern is an n-digit binary number. In case of simultaneous recognition, n-digit numbers are compared. In case of a stepped-up recognition each digit of the binary number is compared step-by-step, thus operating with one-digit numbers. This leads to simplification of the machine. The stepped-up method permits descriptions of varying length. However, simultaneous description is more noiseproof than stepped-up description. The recognition is the more reliable, the more the descriptions of the patterns differ from one another. The description differences may be associated with the concept of distances.

Thus, in addition to the above requirement of minimization, a description must satisfy the requirement of a greatest minimum distance between two descriptions. It is not clear if this distance maximization may be formulated as a mathematical problem. The actual printed characters need some preparation, which consists in elimination of minor faults. The preparation may be a separate operation or may be combined with the examination. On the subject of the so-called self-teaching reading machine, it is stated that this prepares the standard description by itself. This is done under control of a human operator, from which the machine receives signals of approval or disapproval. Under the action of these signals the description is corrected. When a sufficient degree of reliability is achieved, the self-teaching process is terminated. The paper concludes that a detailed classification of reading machines must be postponed until unsolved problems are cleared up. By finding optimum solutions, the still very complex technique of reading machines may be simplified considerably.

83149

S/108/60/015/009/001/008
B002/B067

6.9400

AUTHORS: Blokh, E. L., Kharkevich, A. A., Members of the Society

TITLE: Some Properties of Communication Systems[4] With Fading[25]

PERIODICAL: Radiotekhnika, 1960, Vol. 15, No. 9, pp. 3-9

TEXT: Only additive fluctuation noises have as yet been theoretically studied. The signal received is regarded as the sum of the emitted signal and the noise. On the other hand, multiplicative noise, the so-called fading, has hitherto not been theoretically treated. It consists in the fact that the intensity of the received signal is subject to random fluctuations. Three cases of interference are distinguished in the theoretical treatment: I. Additive noise. II. Fading. System with an active pause (phase modulation or frequency modulation). III. Fading. System with a passive pause (amplitude modulation). The dependence of the carrying capacity on the transition probability is computed for each case and graphically represented (Fig.). Furthermore, the identification of the regenerative codes is considered. As computation shows, case I requires distances as large as possible and code combination as long as

Card 1/2

83909
S/108/60/015/010/002/008
B012/B060

6.9000

AUTHOR: Kharkevich, A. A., Active Member of the Society

TITLE: The Discrimination of Continuous Signals

PERIODICAL: Radiotekhnika, 1960, Vol. 15, No. 10, pp. 11-13

TEXT: The author examined the possibility of representing by one or several numbers a signal given in the finite region in the form of a continuous function. The optimum selection of such numbers is discussed. The present considerations were made in connection with the construction of identification machines serving for the identification of continuous circuits. If in the range of $0<t<T$ signals are given in form of continuous functions $y_k(t)$, the ideal reception method according to Kotel'nikov then consists in every received signal $x(t)$ being compared with each of the possible systems according to $d_k^2 = \int_0^T \left[x(t)-y_k(t)\right]^2 dt$ (1) and is then identified with the y_k in which d_k is smallest. Geometrically,

Card 1/2

83909

The Discrimination of Continuous Signals S/108/60/015/010/002/008
B012/B060

d_k is the interval between the ends of vectors x and y_k in the infinitely dimensional (Hilbert) space. The comparison is found to be more convenient when carried out with numbers denoting the functions, instead of with the functions themselves. The author therefore studied the possibility of expressing the y_k-function by some discrete numerical parameters. Formula (2) is written down, which in a general form, expresses this numerical parameter in the linear case. Every y_k-function may be designated by one or several discrete numbers on the strength of $c_k = \int_0^T \varphi(t) y_k(t) dt$ (2). The criterion for selection the weighting function φ is then established. If the y-functions are to be distinguished, φ must be selected in such a way that the numerical parameters c_k (coefficients in the expansion of y_k into a series after the φ functions) are the most markedly distinguished. Two cases are considered: (1) only two functions y_1 and y_2 are given, and (2) three functions y_1, y_2, and y_3 are given. The second case is more complicated and it is pointed out that practical ways of solving this task are still to be worked out. There are 4 figures.

Card 2/2

TURBOVICH, Iosif Timofeyevich; KHARKEVICH, A.A., otv. red.; MEL'NIKOVSKAYA, R.D., red. izd-va; ASTAF'YEVA, G.A., tekhn. red.

[Method of proximity systems and its use in radio engineering for establishing procedures in designing linear and nonlinear systems] Metod blizkikh sistem i ego primenenie dlia sozdaniia inzhenernykh metodov rascheta lineinykh i nelineinykh radiotekhnicheskikh sistem. Moskva, Izd-vo Akad.nauk SSSR, 1961. 250 p. (MIRA 15:2)

1. Chlen-korrespondent Akademii nauk SSSR (for Kharkevich).
(Radio) (Automatic control)

KHARKEVICH, Aleksandr Aleksandrovich; KOSTIYENKO, A.I., red.;
GAVRILOV, S.S., tekhn. red.

[Spectra and analysis] Spektry i analiz. Izd.4. Moskva, Gos.
izd-vo fiziko-matem. lit-ry, 1962. 236 p. (MIRA 15:6)
(Spectrum analysis)

KHARKEVICH, Aleksandr Aleksandrovich; NOVIKOVA, Ye.S., red.; SLUTSKIN, A.A., tekhn. red.

[Fundamentals of radio engineering]Osnovy radiotekhniki. Moskva, Sviaz'izdat, 1962. 557 p. (MIRA 15:12)
(Radio)

KHARKEVICH, A.A.

BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; BERKOVICH, D.M., zaml glav. red.; LERNER, A.Ya., doktor tekhn. nauk, prof., zam. glav. red.; AVEN, O.I., red.; AGEYKIN, D.I., red.; kand. tekhn. nauk, dots., red.; AYZERMAN, M.A., red.; VENIKOV, V.A., doktor tekhn. nauk, prof., red.; VORONOV, A.A., doktor tekhn. nauk, prof., red.; GAVRILOV, M.A., doktor tekhn. nauk, prof., red.; ZERNOV, D.V., red.; IL'IN, V.A., doktor tekhn. nauk, prof., red.; KITOV, A.I., kand. tekhn. nauk, red.; KOGAN, B.YA., doktor tekhn. nauk, red.; KOSTOUSOV, A.I., red.; KRINITSKIY, N.A., kand. fiz.-mat. nauk red.; LEVIN, G.A., prof. red.; LOZINSKIY, M.G., doktor tekhn. nauk, red.; MOSSIYEVSKIY, V.I., red.; MAKSAREV, Yu.Ye., red.; MASLOV, A.A., dots., red.; POPKOV, A.A., red.; RAKOVSKIY, M.Ye., red.; ROZENBERG, L.D., doktor tekhn. nauk, prof., red.; SOTSKOV, B.S., red.; TIMOFEYEV, P.V., red.; USHAKOV, V.B., doktor tekhn. nauk, red.; FEL'DBAUM, A.A., doktor tekhn. nauk, prof., red.; FROLOV, V.S., red.; KHARKEVICH, A.A., red.; KHRAMOY, A.V., kand. tekhn. nauk, red.; TSYPKIN, Ya.Z., doktor tekhn. nauk, prof., red.; CHELYUSTKIN, A.B., kand. tekhn. nauk, red.; SHREYDER, Yu.A., kand. fiz.-mat. nauk, dots., red.; BOCHAROVA, M.D., kand. tekhn. nauk, starshiy nauchnyy red.; DELONE, N.N., inzh., nauchnyy red.; BARANOV, V.I., nauchnyy red.; PAVLOVA, T.I., tekhn. red.

(Continued on next card)

BERG, A.I.—— (continued). Card 2.

[Industrial electronics and automation of production processes]Avtomatizatsiia proizvodstva i promyshlennaia elektronika. Glav. red. A.I.Berg i V.A.Trapeznikov. Moskva, Gos.nauchn. izd-vo "Sovetskaia Entsiklopediia." Vol.1. A - I. 1962. 524 p. (MIRA 15:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Sotskov, Kharkevich, Zernov, Timofeyev, Popkov).

(Automatic control) (Electronic control)

KHARKEVICH, A.A.

Asymptotic expression of transmission speed with high reliability. Radiotekhnika 17 no.1:76-77 Ja '62. (MIRA 15:2)

1. Deystvitel'nyy chlen Nauchno-tekhnicheskogo obshchestva radiotekhniki i elektrosvyazi imeni Popova.
(Information theory)

KHARKEVICH, A.A.

A theorem concerning error correcting codes. Radiotekhnika 17 no.5:80 My '62. (MIRA 15:5)

1. Deystvitel'nyy chlen Nauchno-tekhnicheskogo obshchestva radiotekhniki i elektrosvyazi imeni Popova.
(Error correcting codes (Information theory))

42073

S/108/62/017/011/001/007
D413/D308

AUTHORS: Blokh, E.L. and Kharkevich, A.A., Members of the Society (see Association)

TITLE: The parasitic modulation caused by small-amplitude additive interference

PERIODICAL: Radiotekhnika, v. 17, no. 11, 1962, 5-13

TEXT: The authors consider the parasitic modulation equivalent to or caused by the addition of a small-amplitude statistical noise function to a generalized carrier capable of being modulated in n parameters. A vector representation is mentioned in which the modulation parameters are the coordinates. General expressions are derived for the equivalent parameters of the parasitic modulation, by minimizing the difference between it and the actual carrier-plus-noise. By comparing these values with the maximum usable excursions in the various modulation parameters, one can obtain output signal-to-noise ratios for the various types of modulation and compare their rejection properties. As an example, the values are worked

Card 1/3

The parasitic modulation ...

out for a carrier consisting of a train of trapezoidal pulse in which pulse amplitude, position (phase) and width are considered as modulation parameters, with white noise as interference. The resulting comparison clearly shows up the advantage of pulse position modulation and the importance in it of the initial pulse-duty radio. Since the parasitic modulations in the various parameters are correlated, it should be possible to use these in parameters not carrying information (control parameters) for compensation of the interference, and general relations are derived for this: applied to the above example, they indicate that parasitic pulse-width variations could be used to compensate interference on a PPM channel. It is also suggested that where two parameters are only slightly correlated they could be used in parallel as independent channels to improve the noise rejection. The case of large-amplitude noise is more difficult in general, and calls for computers or experimental work. There are 4 figures.

ASSOCIATION: Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi im. A.S. Popova (Scientific and Tech-

Card 2/3

S/108/62/017/011/001/007
D413/D308

The parasitic modulation ...

nical Society of Radio Engineering and Electrical Communications im. A.S. Popov) [Abstracter's note: Name of association was taken from first page of journal]

SUBMITTED: October 27, 1961

Card 3/3

KHARKEVICH, Aleksandr Aleksandrovich; KOSTIYENKO, A.I., red.;
KRYUCHKOVA, V.N., tekhn. red.

[Control of radio interference] Bor'ba s pomekhami. Moskva,
Fizmatgiz, 1963. 274 p. (MIRA 16:12)
(Radio--Interference) (Information theory)

KHARKEVICH, A.

Information and technology. Priroda Bulg 12 no.2:28-35 Mr-Ap '63.

1. Chl.-kor. na AN na SSSR.

KHARKEVICH, A.A.

Some views underlying the mechanism of creative processes.
Probl. pered. inform. no.14:157-159 '63. (MIRA 16:12)

BLOKH, Efraim Leont'yevich; KHARKEVICH, A.A., otv.red.; SOLOMONOV, V.G., kand.tekhn.nauk, zam.otv.red.; GRIGOR'YEV, Ye.N., red.izd-va; SIMKINA, G.S., tekhn.red.

[Interference rejection of communication systems with feedback.] Pomekhoustoichivost' sistem sviazi s peresprosom. Moskva, 1963. 170 p. (Problemy peredachi informatsii, no.13). (MIRA 17:2)

1. Chlen-korrespondent AN SSSR (for Kharkevich).

ACCESSION NR AM4021138 BOOK EXPLOITATION S/

Kharkevich, Aleksandr Aleksandrovich

Interference control (Bor'ba s pomekhami), Moscow, Fizmatgiz, 1963, 274 p. illus., biblio. 10,500 copies printed.

TOPIC TAGS: signal transmission, interference control, applied information theory

PURPOSE AND COVERAGE: The problem of reliable transmission of signals when there is interference is one of the most important problems of applied information theory at the present time. This monograph is a brief introduction to the modern theory of the methods of increasing interference resistance. It contains a compact presentation of the newest methods, views, and results permitting the problem to be viewed as a whole. The book's objective is to help the beginner working in this field to derive a general picture of the problem and to obtain the basic information that is need for a study of the special literature. The book is intended for radio physicists and radio engineers.

TABLE OF CONTENTS:

Card 1/3

KHARKEVICH, A.A., otv. red.

[Information theory; terminology] Teoriia informatsii; terminologiia. Moskva, Nauka, 1964. 10 p. (Sbornik rekomenduemykh terminov, no.64) (MIRA 17:12)

1. Akademiya nauk SSSR. Komitet nauchno-tekhnicheskoy terminologii. 2. Chlen-korrespondent AN SSSR.

BERG,A.I.,glav.red.; TRAPEZNIKOV,V.A.,glav.red.; TSYPKIN, Ya.Z., doktor tekhn.nauk,prof.,red.; VORONOV,A.A., doktor tekhn.nauk,prof.,red.; SOTSKOV,B.S., doktor tekhn.nauk,red.; AGEYKIN,D.I., doktor tekhn. nauk, red.; GAVRILOV,M.A., red.; VENIKOV,V.A., doktor tekhn.nauk, prof.,red.; CHELYUSTKIN,A.B., doktor tekhn. nauk,red.; PROKOF'YEV, V.N., doktor tekhn.nauk,prof.,red.; IL'IN,V.A., doktor tekhn.nauk, prof.,red.; KITOV,A.I.,doktor tekhn.nauk,red.; KRINITSKIY, N.A., kand. fiz.-matem.nauk,red.; KOGAN,B.Ya., doktor tekhn.nauk, red.; USHAKOV,V.B., doktor tekhn.nauk,red.; LEMER,Yu.A., doktor tekhn. nauk,prof., red.; FEL'DBAUM, A.A.,prof., doktor tekhn.nauk,red.; SHREYDER,Yu.A., kand. fiz.-mat. nauk,dots.,red.; KHARKEVICH,A.A., akad., red.;TIMOFEYEV,P.V., red.; MASLOV,A.A.,dots.,red.; LEVIN, G.A., prof.,red.; LOZINSKIY,M.G., doktor tekhn.nauk,red.; NETUSHIL, A.V., doktor tekhn.nauk,prof.,red.; POPKOV,V.I.,red.; ROZENBERG, L.D.,doktor tekhn.nauk,prof.,red.; LIVSHITS,A.L.,kand.tekhn.nauk,red.

[Automation of production and industrial electronics] Avtomatizatsiia proizvodstva i promyshlennaia elektronika; entsiklopediia sovremennoi tekhniki. Moskva, Sovetskaia Entsiklopediia. Vol.3. Pogreshnost' resheniia - Teleizmeritel'naia sistema chastotnaia. 1964. 487 p. (MIRA 17:10)

1. Chlen-korrespondent AN SSSR (for Sotskov, Gavrilov, Timofeyev, Popkov).

BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; TSYPKIN, Ya.Z., doktor tekhn. nauk, prof., red.; VORONOV, A.A., prof., red.; AGEYKIN, D.I., doktor tekhn.nauk red.;GAVRILOV, M.A., red.; VENIKOV, V.A., doktor tekhn. nauk, prof., red.; SOTSKOV, B.S., red.; CHELYUSTKIN, A.B., doktor tekhn. nauk, red.; PROKOF'YEV, V.N., doktor tekhn. nauk, prof., red.; IL'IN, V.A., doktor tekhn. nauk, prof., red.; KITOV, A.I., doktor tekhn. nauk, red.; KRINITSKIY, N.A., kand. fiz. mat. nauk, red.; KOGAN, B.Ya., doktor tekhn. nauk, red.; USHAKOV, V.B., doktor tekhn. nauk, red.; LERNER, A.Ya., doktor tekhn. nauk, prof., red.; FEL'DBAUM, A.A., doktor tekhn. nauk, prof., red.; SHREYDER, Yu.A., kand. fiz.-mat. nauk, red.; KHARKEVICH, A.A., akademik, red. [deceased]; TIMOFEYEV, P.V., red.; NASLOV, A.A., dots., red.; TRUTKO, A.F., inzh., red.; LEVIN, G.A., prof., red.; LOZINSKIY, M.G., doktor tekhn. nauk, red.; NETUSHIL, A.V., doktor tekhn. nauk, prof., red.; POPKOV, V.I., red.; ROZENBERG, L.D., doktor tekhn. nauk, prof., red.; LIFSHITS, A.L., kand. tekhn. nauk, red.; AVEN, O.I., kand. tekhn. nauk, red.; BLANN, O.M. [Blunn, O.M.], red.; BROYDA, V., inzh.,prof.,red.; BREKKL', L [Brockl,L.] inzh., knad. nauk, red.; VAYKHARDT, Kh. [Weichardt, H.], inzh., red.; BOCHAROVA,M.D., kand. tekhn. nauk, st. nauchn. red.

[Automation of production processes and industrial electronics] Avtomatizatsiia proizvodstva i promyshlennaia elektronika; entsiklopediia sovremennoi tekhniki. Moskva, Sovetskaia entsiklopediia. Vol.4. 1965. 543 p. (MIRA 18:6)

ACC NR: AM5020532 Monograph UR/

Kharkevich, Aleksandr Aleksandrovich

Suppression of interference (Bor'ba s pomekhami) 2d ed., rev. Moscow, Izd-vo "Nauka", 1965. 274 p. illus., biblio. 23,500 copies printed.

TOPIC TAGS: interference suppression, communication system, signal interference, signal reception, SIGNAL TRANSMISSION

PURPOSE AND COVERAGE: This book is intended for radio physicists and radio engineers who are beginning their work in the field of signal transmission. The book is concerned with the reliable transmission of signals in the presence of noise. It represents an introduction to the modern theory on methods for improving noise immunity and discusses the newest methods, concepts, and results so as to make it possible to visualize the problem in its entirety. The author thanks E. L. Blokh, O. V. Popov, and B. R. Levin for their assistance.

TABLE OF CONTENTS:

Card 1/11 UDC 621.391.82

ACC NR: AM5020532

Card 2/11

ACC NR: AM5020532

(comparison of AM and FM); pulse carrier (comparison of APM, FPM and DPM). Spurious increment correlation.

§ 8. Detection with single reading -- 61
Defining the problem: description of the method of reception. Ideal receiver. Probability of error. Selection of threshold. Dependence of error probability on s/n ratio. Example of normal distribution. Reception of radio signal; envelope distribution.

§ 9. Detection by the storage method -- 70
Substance of the method. Storage with a continuous signal. Increase in s/n ratio due to storage. Case of dependent noise values. Three examples with differently arranged correlation. Storage of a continuous signal. Integral reception. General observations on the storage method.

§ 10. Optimal linear receiver -- 79
General aspect of a linear functional; receiver circuit. Optimal weighting function. Noise dispersion at output and s/n ratio. Particular cases.

§ 11. Active and passive filters -- 86

Card 4/11

Linear converter using a multiplier and a passive four-terminal network as active and passive filters. Optimal filter. Pulse reaction. Two examples. Frequency characteristic of an optimal passive filter. Examples. Comb filter.

§ 12. Discrimination between two signals -- 95
Ideal receiver. General expression for the boundary of two equiprobable signals. The case of a monotonal volumetric density of probabilities. Expression for the probability of error. Two variants of the ideal receiver circuit. Correlation receiver. Case of nonequiprobable signals. Case of nonmonotonal noise distribution. Correlated noise.

§ 13. Discrimination between many signals -- 110
Discrimination of a quantized set of constant values or functions differing in their constant multiplier. Discrimination of orthogonal signals. Receiver circuit. Discrimination between random functions of equal energy. Geometrical model and intrinsic regions. Various expressions for error probability. Two variants of ideal receiver circuits. Difficulties in calculating error probability. One asymptotic formula (for $n \to \infty$).

§ 14. Detection of incompletely known signals -- 122

Card 5/11

ACC NR: AM5020532

Signal distortion and noise; more exact definition of the concept of noise. Additive noise correlated to signal. Geometric model. Expansion of noise into components and derivation of expression for s/n ratio. Optimal reception in the case of correlated noise.

§ 18. Signal detection as a statistical problem -- 150
Observations and hypotheses. Criteria and rules of solution. *A priori* and *a posteriori* probabilities. Plausibility ratio. Error probability. Signal transmission and false alarm. Losses and risk. Criterion of the minimal risk. Criterion for minimizing the maximal risk. Siggert-Kotel'nikov and Neumann-Pearson observers. Summary of criteria and rules of solution. Example. Operating characteristic of the receiver.

§ 19. Consecutive analysis -- 167
General idea; introduction of the zero zone. Criterion of probability ratio. Selection of zero-zone boundaries; approximate values. Mean number of readings. Example. Comparison with the accumulation method. Asymptotic relationships.

§ 20. Transmission with interrogation of the source -- 176

Card 7/11

ACC NR: APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000721820011

Use of reverse channel. Essence of a system using interrogation. Improvement of reliability through use of interrogation. Consumption of energy for interrogation. Example. Comparison with storage. Optimal combined system. Comparison with the classical pattern of a consecutive analysis.

§ 21. Feedback systems (a review) -- 186
General transmission circuit and various methods of feedback connection. Feedback for signal control. Systems with comparison and systems with interrogation of the source. Classification of systems with comparison and systems with interrogation of the source.

§ 22. Correcting codes; general considerations -- 191
Detection and correction of errors. Theorems concerning the detecting and correcting capacity of an arbitrary block code. Code splitting. Error vector. Example of a binary code with different splittings. Geometric representation of splitting. Composition of a code correcting a specific error. Correction of all errors of a given multiplicity factor. Different formulation of correcting code requirements. Code of irregular reliability. General method of decoding by means of a tree circuit.

Card 8/11

ACC NR: AM5020532

Principle of continuous coding. Hagelbarger recurrent codes. Protective interval. Code (1/2). Coder using shift register. Decoder. Examples. Evaluating the complexity of equipment by the number of register cells. High-effectiveness codes. Recurrent codes used in the detection of burst errors. Example.

27. Correcting codes (a review) -- 242
Characteristics of the situation. Classification diagram of modern correcting codes. Explanations concerning the classification.

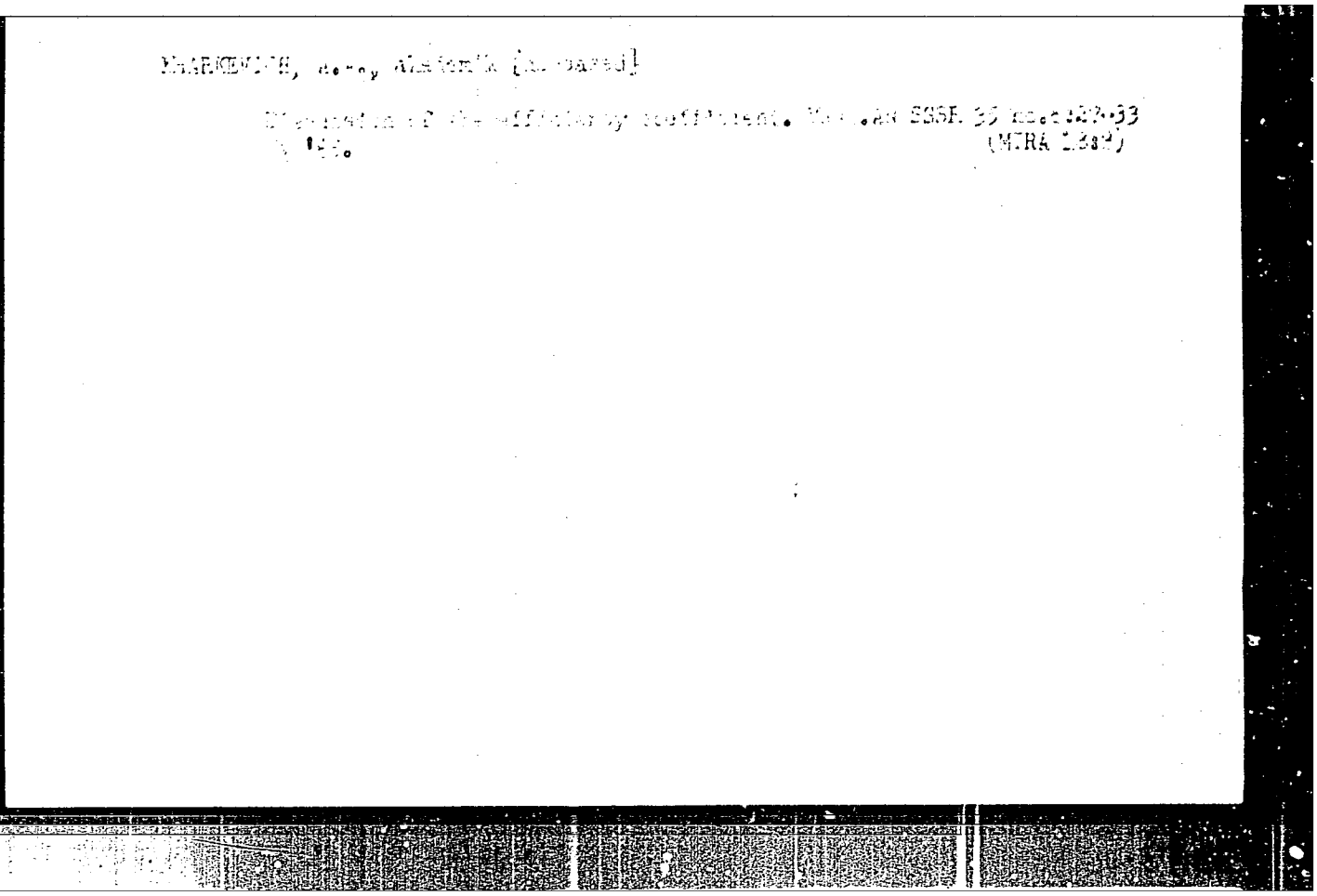
Card 10/11

ACC NR: AM5020532

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000721820011

SUB CODE: 09/ SUBM DATE: 19Mar65/ ORIG REF: 015/ OTH REF: 017/

Card 11/11



KHARKEVICH, A.A. [deceased]

Some methodical aspects of the recognition problem. Probl. pered. inform. 1 no.3:3-11 '65. (MIRA 18:11)

L 39759-66 EWT(d)/T/EWP(1) IJP(c) GG/BH/GD-2

ACC NR: AP6015538 SOURCE CODE: UR/0108/65/020/009/0079/0080

AUTHOR: none

ORG: none

TITLE: A. A. Kharkevich (Deceased)

SOURCE: ~~Radiotekhnika, v. 20~~, no. 9, 1965, 79-80

TOPIC TAGS: information theory, pattern recognition, academic personnel, scientific personnel, acoustics

ABSTRACT: A. A. Kharkevich died 30 March 1965 at the age of 61. Born in 1904 in Leningrad, Kharkevich began working in 1924, entered scientific work in 1928. A great portion of his work is related to the theory, design and calculation of electro-acoustical apparatus. He designed a number of loudspeakers now in production in the USSR. He has recently worked in the area of spectra and auto-oscillation theory. He contributed greatly to the early development of information theory in the USSR. Aleksandr Aleksandrovich was the first major scientist in the USSR to study form recognition. Many of the over 100 articles and 12 books which this great cybernetician wrote have been translated in the USA, France, Poland and elsewhere. He was also a professor of the Military Electronics Academy and taught at the Kiev and L'vov polytechnical institutes, the Leningrad and Moscow communications institutes. He was also the head of the Institute of Problems of Information Transmission of the Academy of Sciences, the head of the Chair of Electronics at the Moscow Electronics Institute, a member of the bureau of the Department of Mechanics and Control Process of the Academy of Sciences and performed great work with production in industrial enterprises. Orig. art. has: 1 figure. [JPRS]

SUB CODE: 09, 20 / SUBM DATE: none

Card 1/1

L 38110-66 JT

ACC NR: AP5015830 SOURCE CODE: UR/0030/65/000/006/0027/0033

AUTHOR: Kharkevich, A. A. (Academician, Deceased)

42
B

ORG: none

TITLE: Discussion of efficiency

SOURCE: AN SSSR. Vestnik, no. 6, 1965, 27-33

TOPIC TAGS: heat energy conversion, thermodynamic efficiency

ABSTRACT: An extension of the scientific concept of efficiency (coefficient of useful action, in Russian) and its measurement and application in new fields, such as automatic control and computer computation is discussed. The author considers the general problem of deriving for any technical set-up an index or coefficient that quantitatively measures how well it fulfills the function imposed upon it. He believes the concept referred to as *efficiency* to be too narrow in the present situation of rapidly developing technology. He presents examples of the inadequacy of the classical definition of efficiency, and discusses the possibility of improving it. The difficulty of the concept of efficiency is connected with the disparate nature of the various forms of energy, especially thermal energy on the one hand and mechanical and electrical on the other, in the sense that thermal energy is of a lower useful quality than the others. Thermal devices with the simple function of heating would possess perfect effi-

Card 1/2 UDC: 531.41

Card 2/2

KHARKEVICH, A. D. Cand. Tech. Sci.

Dissertation: "Automatic Connection Between the ATS (Automatic Telephone Station) of Step-by-Step System and the ATS of Machine System of the "Krasnaya Zarya" Plant." Moscow Inst of Communication Engineers, 5 Jun 47.

SO: Vechernyaya Moskva, Jun, 1947 (Project #17836)

KHARKEVICH, A. D.

Book of problems in automatic telephony; textbook Moskva, Gos. izd-vo lit-ry po voprosam svyazi i radio, 1952. 142 p. (54-18092)

TK6397.K65

KHARKEVICH, A.D.

LEZERSON, V.K.; KHARKEVICH, A.D., redaktor; MARTYNENKO, D.P., redaktor.

[Connection of the ATS-47 automatic telephone station with long distance and institutional telephone stations] Sviaz' ATS-47 s mezhdugorodnoi i uchrezhdencheskimi telefonnymi stantsiiami. Moskva, Gos. izd-vo lit-ry po voprosam sviazi i radio, 1953. 99 p. (MLRA 7:5)
(Telephone stations)

KHARKEVICH, A. D.

"Seminar of the Laboratory for Development of Scientific Problems of Wire Communications, Academy of Sciences USSR," Iz. Ak. Nauk SSSR, Otdel Tekh Nauk, No.1, pp 159-161, 1953

Translation W-27594, 31 Aug 53

KHARKEVICH, A.D.

Optimal capacity of automatic telephone system selectors. Sbor.nauch. rab. po prov.sviazi no.2:120-135 '53. (MLRA 7:5)
(Telephone, Automatic)

KHARKEVICH, A.D.

Laboratory Seminar on Scientific Problems concerning Communications under the auspices of the Academy of Sciences of the U.S.S.R. Izv.AN SSSR Otd.tekh. nauk no.9:1366-1367 S '53. (MLRA 6:10)
(Telecommunication)

KHARKEVICH, A.D.

USSR/Scientific Organization FD-825

Card 1/1 : Pub. 41 - 17/17

Author : Raskatov, V. M., Petrov, B. N., Naumov, B. N. Baron, L. I., Kalashnikova, P. Ya., and Kharkevich, A. D.

Title : In the scientific institutions of the Department of Technical Sciences of the Academy of Sciences of the USSR

Periodical : Izv. AN SSSR, Otd. tekh. nauk, 2, 111-128, Feb 1954

Abstract : Describes activity of various scientific institutions in five articles: 1. Conference on Automation of Technological Processes in Machine Building, pp 111-116. Report on conference conducted in 1953. Gives authors, titles, and abstract of reports presented. 2. Second All-Union Conference on the Theory of Automatic Regulation, pp 117-122. Gives authors, titles, and abstracts of reports. 3. Discussion of results of research on use of wetting agents for combatting mine dust, pp 123-124. Report on December 1953 meeting of Commission for Prevention of Silicosis. Gives titles, authors, abstracts of reports on wetting agents used for removal of dust from mine air. 4. Seminar on the Theory of Machines and Mechanisms of the Institute of Machine Building of the Academy of Sciences of the USSR, pp 124-126. Gives authors, titles and abstracts of some reports discussed in 1953. 5. Seminar of the Laboratory for Developing Scientific Problems of Wire Communication of the Academy of Sciences of the USSR, pp 126-128. Report on second half of 1953. Gives authors, titles, and abstracts of reports.

KHARKEVICH, A.D.

Seminar of the laboratory for the study of scientific problems of communications by wire in the Academy of Sciences of the U.S.S.R. Izv. AN SSSR Otd.tekh.nauk no.2:126-128 F '54.(MLRA 7:7)
(Telecommunications)

KHARKEVICH, A.D., kandidat tekhnicheskikh nauk; ROGINSKIY, V.N., kandidat tekhnicheskikh nauk.

Optimum capacity of a preselector. Vest.sviazi 14 no.3:11-12 Mr '54. (MLRA 7:5)

1. Starshiye nauchnyye sotrudniki Laboratorii po razrabotke nauchnykh problem provodnoy svyazi Akademii nauk SSSR.
(Telephone stations)

ROGINSKIY, Vadim Nikolayevich; KHARKEVICH, Anatoliy Dem'hanovich; POVAROV, G.N., redaktor; [illegible]AKAROVA, A.Ya., redaktor; SOKOLOVA, R. Y a, tekhnicheskiy redaktor.

[Telephone relay systems] Releinye skhemy v telefonii. Moskva, Gos. izd-vo lit-ry po voprosam sviazi i radio, 1955. 165 p. (MLRA 8:8)
(Telephone) (Electric relay)

KHARKEVICH, A.D.

All relay selector design. Sber. nauch. rab. po prov. sviazi no.4:128-136 '55. (MLRA 9:2)
(Telephone, Automatic--Apparatus and supplies)

KHARKEVICH, A.D.

Optium number of transmission paths in the stages ofselection of automatic telephone systems. Sber. nauch. rab. po prov. sviazi no.4:137-143 '55. (MLRA 9:2)
(Telephone, Automatic)

KHARKEVICH, A.D.

USSR/Automatics and telemechanics FD-2659

Card 1/1 Pub. 10-6/15

Author : Kharkevich, A. D. (Moscow)

Title : The optimum number of directions in group selection

Periodical : Avtom. i telem. 16, Jul-Aug 1955, 367-371

Abstract : The author considers the problem of the number of directions of the group selector and determines the number of direction for which the relative cost of the equipment is a minimum. He concludes that the optimum value of the number of directions of the group selector depends upon the magnitude of that part of the cost of the group selector which does not vary for a change in the capacity of the selector, and that the greater the unchanged part of the cost the more advantageous the application of a large number of directions in the group selector. In the case where the cost of the selector can be considered proportional to the capacity (relay selector), the optimum number of directions equals three, while the total number of outputs of the contacts in all the group selectors will be a minimum. Seven references, e.g. A. D. Kharkevich, "Problem of the optimum capacity of selectors of automatic telephone stations," Sbornik nauchnykh rabot po provodnoy svyazi AN SSSR [Symposium of scientific works on wire communications, Acad. Sci. USSR], No 2, 1953.

Institution :

Submitted : April 15, 1954

KHARKEVICH, A.D.

112-1-2372

Translation from: Referativnyy Zhurnal, Elektrotekhnika, 1957, Nr 1, p. 348 (USSR)

AUTHOR: Kharkevich, A. D.

TITLE: Building Fully Accessible Switching Systems (O postroyenii polnodostupnykh kommutatsionnykh sistem)

PERIODICAL: Sbornik nauch. rabot po provodnoy svyazi. Nr 5, Moscow, AN SSSR, 1956, pp.79-92

ABSTRACT: Methods of building fully accessible switching systems are investigated and the most efficient ones are identified. A general method of building multistage switching systems is submitted and formulas for the determination of the total number of interconnecting points with a full and a partial multistage structure are presented. Areas of application of the most efficient methods of construction are established.

Card 1/1

From the author's summary

Trends in the development of automatic telephone equipment. Elektrosviaz' 10 no.3:40-46 Mr '56. (MLRA 9:7)
(Telephone, Automatic)

KHARKEVICH, A.D.

Basic types of automatic telephone crossbar systems of Swedish manufacture. Elektrosviaz' 11 no.1:57-72 Ja '57. (MLRA 10:2)

(Sweeden--Telephone, Automatic)

AUTHOR KHARKEVICH, A.D., PA - 2840

TITLE Multistage Construction of Non-Blocking Switching Networks. (Mnogostupennoye postroyeniye polnodostupnykh kommutatsionnykh sistem - Russian)

PERIODICAL Doklady Akademii Nauk SSR, 1957, Vol 112, Nr 6, pp 1043-1046, (U.S.S.R.)

Received 4/1957 Reviewed 5/1957

ABSTRACT The present paper describes a general method for the construction of such systems and furnishes recurrence formulae for the estimation of communication systems according to the number of union points. By a communication system a direct acting system with M inputs and N outputs is here understood, which at a given moment can effect a connection between in-and outputs. Such a system may e.g. be a contact multipole. Technical applications are mentioned. A communication system is called "non-blocking" if it allows connection between an arbitrary input and an arbitrary output irrespective of the number of connections established up to the observed moment. Here the maximum possible number of connections is determined by the smaller of the numbers M and N. A measure of the efficiency of this commutation system is the total number T of the union points. The trivial construction of such a system in the form of a commutator is not always the most effective. CLOS,C. BSTJ, 32, Nr 2, 406, (1953) suggested an effective method for the construction of non-blocking commutation systems. But this method can be represented as a special case of a more general construction (multistage construction). This multistage construction of a commutation system can be

Card 1/2

KHARKEVICH, A. D.

20-2-20/60

AUTHOR: Kharkevich, A. D.

TITLE: A Method for the Approximate Estimate of the Transmissivity of a Two-Term Commutation System (Metod priblizhennoy otsenki propusknoy sposobnosti dvukhzvennoy kommutatsionnoy sistemy)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 2, pp.308-309 (USSR)

ABSTRACT: The two-term commutation system under consideration in the paper under review has kn inlets and ml exits, and it consists of the two cascades A and B. Each of the k commutators of the first cascade contains n inlets and m exits, whereas each of the m commutators of the second cascade has k inlets and l exits. The commutators of the first and of the second cascade are connected with each other in the usual way by a mixing wiring (?). In the commutation system here under consideration with variable accessibility each arbitrary exit of the system is accessible to each arbitrary inlet of the system, as long as there are no occupied connecting lines within the system. If a connecting line is occupied for those inlets of the commutation system which can use this connect-

Card 1/3

ing line, then the accessibility of the exits decreases by 1 and amounts to $a_1 = (m-1)l$. If i connecting lines are occupied (these lines going out from a certain commutator of the first cascade), then the accessibility amounts to $a_i=(m-i)l$. The paper under review suggests the following method for the computation of the transmissive ability: The graduated bundle which is equivalent with respect to the transmissive ability has to be found. Thus the computation is reduced - the accessibility being variable - to the computation with constant accessibility of the connecting lines. The condition for the equivalence of the transmissivity of the system here under consideration with a graduated bundle is written down in its explicit form in the paper under review. If it is possible to linearly approximate the function which characterizes the losses in the graduated bundle (?), then the equivalent accessibility is identical with the mathematical expectation of the accessibility. There are 2 figures, and 8 references, 4 of which are Soviet..

Card 2/3

KHARKEVICH, A. D.

"The Application of the Methods of Probability Diagrams."

Report presented at All-Union Conference on 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.)

AUTHOR: Kharkevich, A.D. Sov/106-58-2-6/16

TITLE: Grouping Scheme for a Telephone Branch Exchange Using Crossbar Switches (Gruppoobrazovaniye telefonnoy podstantsii na koordinatnykh soyedinitelyakh)

PERIODICAL: Elektrosvyaz', 1958, Nr 2, pp 43 - 50 (USSR).

ABSTRACT: The purpose of the article is to deduce the optimum choice of circuit-grouping in a telephone branch exchange based on the use of crossbar switches. The specific example taken for illustration purposes is an exchange with a capacity of 100 lines; the subscriber load requires 10 incoming and 10 outgoing lines; connection between two subscribers is achieved via the local automatic exchange using two connecting lines. The first arrangement examined provides a full availability interconnection, uses relays and has 2 000 points of connection. Using a suggestion made by Clos (B.S.T.J., 1953) together with crossbar switches, this number is reduced to 1 715. In Figure 2, all subscribers are divided into 10 groups of 10 each and the number of internal connections made from each group is limited to 4. The number of connection points now falls to 1 200. Clos' device here only gives an improvement to 1 159. It is concluded that the best arrangement has two

Cardl/2

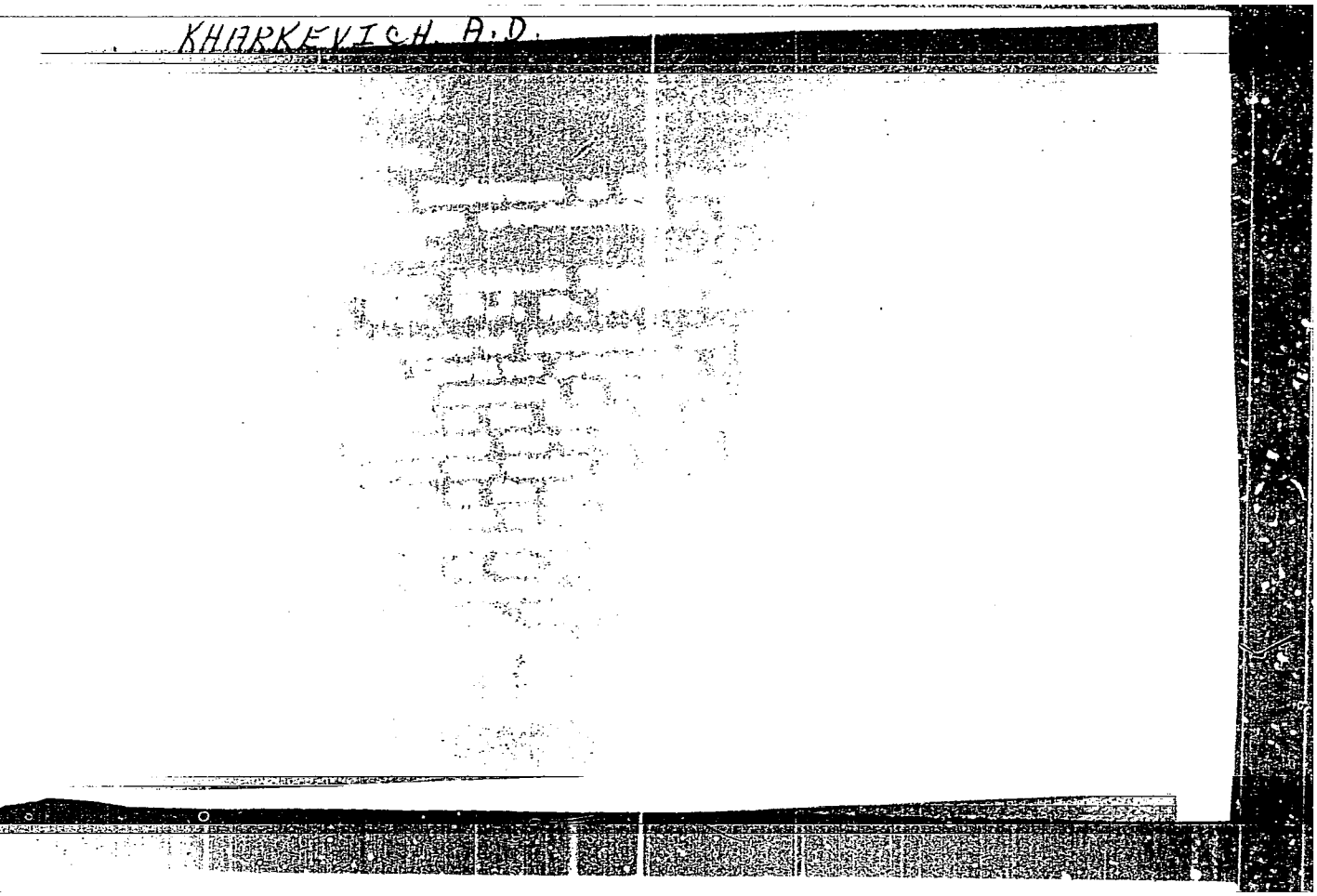
Grouping Scheme for a Telephone Branch Exchange Using Crossbar Switches

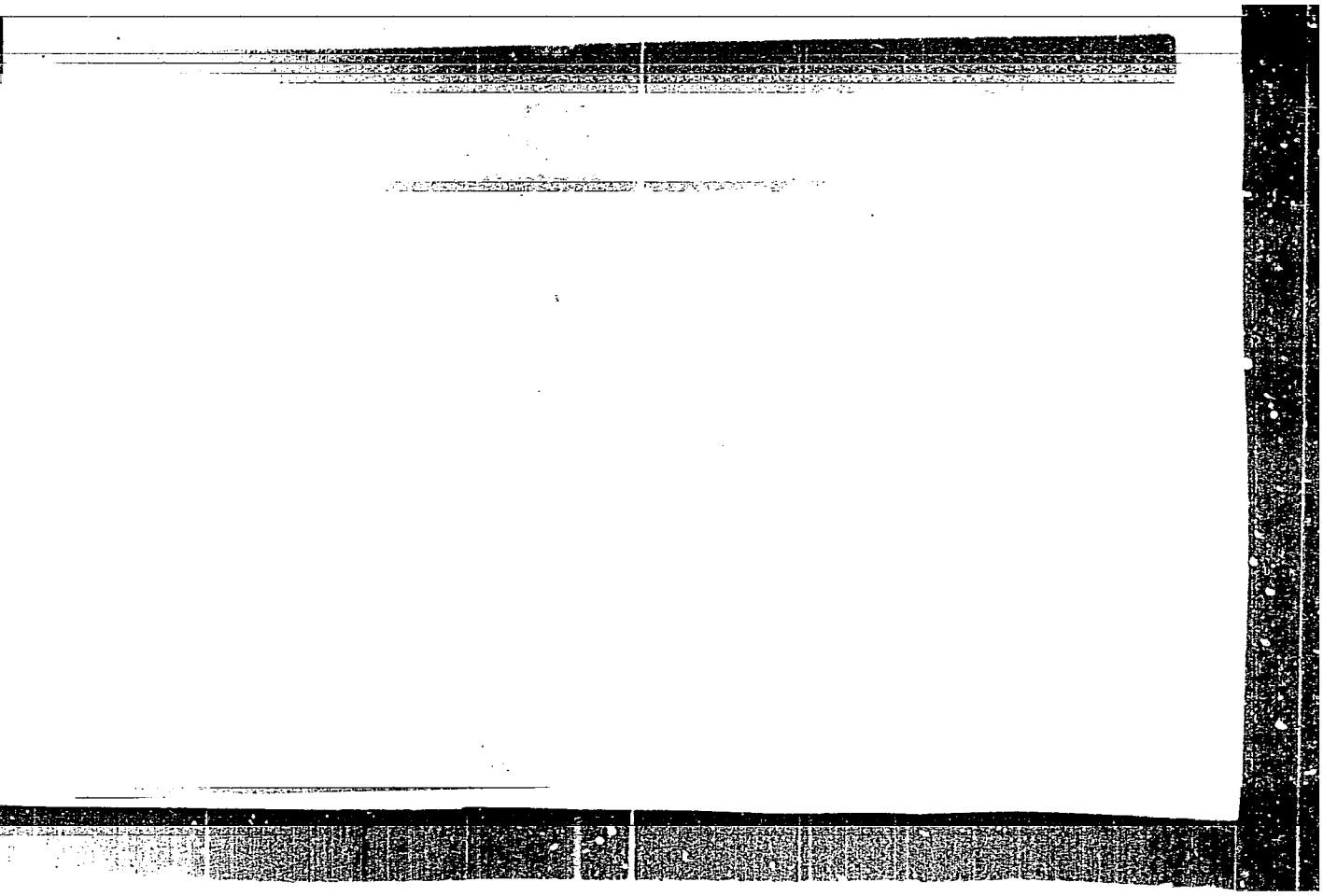
stages of switching for the outgoing lines and three stages for those coming in. Figure 4 shows a circuit with one selector, having 700 connections.
There are 5 figures, 1 table and 16 references, 10 of which are Soviet and 6 English.

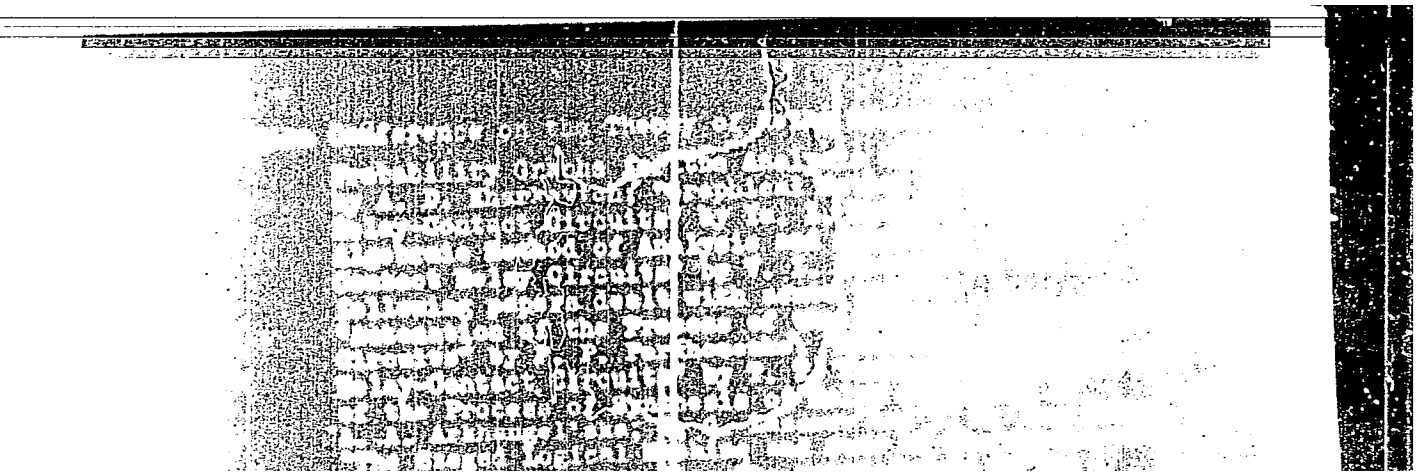
SUBMITTED: July 30, 1957

1. Telephone communication systems--Test methods 2. Switches --Applications

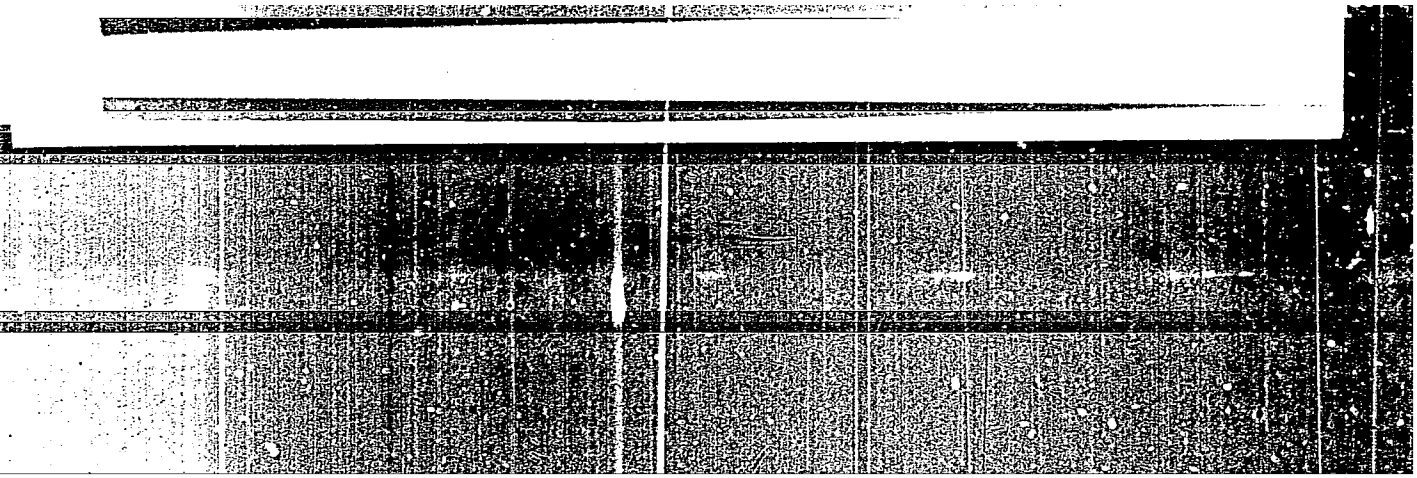
Card 2/2







APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000721820011-9"



APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000721820011-9"