20(4)
S/021/60/000/004/005/010
D232/D305

Two universal criteria of ...

here since they depend not only on the quality of the computer but also on the experience accumulated. The price of one operation is then

$$q = \frac{\mathcal{F}(T)}{\tau \cdot n_e} \qquad (4)$$

which is called the price of effective speed. [Abstractor's note: Not defined]. The second universal criterion is then that of minimum price of effective speed. Calculations made by Yu.V. Kapitonova according to the methods described are said to show that the computer "Kyyiv" designed at the computing center of AS UkrSSR has a price of effective speed about 25 times less than that of the serial computer "Ural 1", in the case of sufficiently complex problems; further the price of speed depends on the type of problems, apart from the quality of the computer.

ASSOCIATION: Obchyslyuval'nyy tsentr AN URSR (Computing Center AS UkrSSR)

PRESENTED: by Corresponding Member AS UkrSSR V.M. Glushkov
SUBMITTED: December 12, 1959
Card 5/5

GLUSHKOV V.M

S/102/60/000/005/003/008
D251/D305

AUTHORS: Hlushkov, V. M. and Pul'kevych, L. A. (Kiyev)

TITLE: Memory units of electronic digital computers (A review of the basic tendencies of operation of former memory units)

PERIODICAL: Avtomatyka, no. 5, 1960, 22-32

TEXT: The memory units (MU) of various computers are discussed, namely, EDSM Mark 1 and Mark 2, (USA) Cabo (GFR Japan and Czechoslovakia) etc. Ferromagnetic tape MUs, ferroelectric MUs and MUs based on the effect of superconductivity are described. The Soviet potentialoscope ЛН-1(LN-1) and its use in the computer БЭЛМ (VELM) are briefly described. Horizontal and vertical magnetic drums and the IBM free magnetic disc MU are illustrated, as well as the outer appearance of a ferrite core MU. Special attention is paid to the problem of ferromagnetic tapes 1000 - 2000°A thick employed at ultra-high operative speed. For a switching time of 10 μsec, two modifications of magnetic tape are described.

Card 1/1

2:047

S/021/60/000/005/001/015
D210/D304

9,7140 (1121)

AUTHOR: Hlushkov, V.M., Corresponding Member, AS UkrSSR

TITLE: On the optimal dimensions of operative memory units of electronic computers

PERIODICAL: Akademiya nauk ukrayins'koyi RSR Dopovidi, no. 5, 1960, 571-574

TEXT: The question of the optimal dimensions of the operative memory unit (OMU) may be divided into two parts: that of the number of divisions in the cells of the OMU, and that of the number of cells. It is assumed that the maximum number of divisions in the final result is known. It is necessary to know the number of additional divisions required so that the round-off error disappears. The author observes that in the case of computors it is impossible in practice to solve this problem by means of O.M. Krylov's rule. [Abstractor's Note: Rule not stated.] Assuming that the round-off error is independent of the size of the quantities involved, and that the round-off error of the sum of a number

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On the optimal dimensions of...

of operations is equal to the sum of the errors of the individual operations, then the total root mean square deviation of the round-off is given by

$$\varepsilon_n = \sqrt{\int_{-\frac{1}{2}}^{\frac{1}{2}} \int_{-\frac{1}{2}}^{\frac{1}{2}} \cdots \int_{-\frac{1}{2}}^{\frac{1}{2}} (x_1 + x_2 + \ldots + x_n)^2 \, dx_1 \, dx_2 \ldots dx_n} = \sqrt{\frac{n}{12}} \quad (1)$$

where x_i is the round-off error of the i^{th} operation, and n is the range. Hence, for the 0.954 probability level, the total round-off error will not exceed twice the root mean square deviation. It is supposed that the computor performs numerical operations to base q, and that m additional divisions are required to deal with the round-off. Then at the 0.954 probability level, $n \leq 3q^{2m}$ (5). The optimal number of cells is to be chosen to ensure the maximum quick effective response of the computer. A possible method of calculation is proposed which is based, however, on methods which introduce an unavoidably large quantity of

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27047

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D210/D304

On the optimal dimensions of ...

unknown factors these may be treated only approximately. The author considers the case of an OMU of ferrites. If x is the number of cells of the OMU, then the time taken for the transition of the process from one cell to another is given by $t_2 = a\sqrt{x}$ (7) where a and b are some constants. b characterizes the time used for the transition of the process at the control circuits. This time depends not only on the size of the memory but also on the control circuits. Assuming that the control circuit may be altered, e.g. by increasing the power of the impulse formation apparatus, then it is possible to make use of the criteria of maximum efficiency. $P(x)$ is the function giving the maximum number of operations which a computer with an OMU of x cells can perform without appeal to an external memory unit (EMU). The EMU is characterized by two constants: the mean waiting time c and the time of selecting a code d. Then the time of appeal is $t_B = 2c + nd$ (9). If t_o is the mean time of performing a single operation in the arithmetic section of the computer and n is the address number in the instruction,

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27047

S/021/60/000/005/001/015
D210/D309

On the optimal dimensions of ...

then the nominal time t_H of carrying out the operation (1 instruction) is given by and the

$$t_H = (p+1)t_o + t_a + (p+1)ab\sqrt{x} + t_a \quad (10)$$

effective mean time t_e of carrying out a single operation is

$$t_e = t_H - \frac{B}{f(x)} = (p+1)a + b\sqrt{x} + t_a - \frac{2(c+nd)}{f(x)} \quad (11)$$

By finding the minimum of (11) under the additional conditions $x \geq y$, the character of the information exchange between the OMU and the EMU may be obtained. In the case $f(x) = x^2$,

$$x = \sqrt[5]{64\left(\frac{c+nd}{(p+1)b}\right)^2} \quad (14)$$

Given that b ... minimum ... [illegible] for a binary computer ... [illegible]

$x = 4\sqrt[5]{4(c+nd)^2}$ (15). There are 1 table and 1 Soviet-bloc reference.

ASSOCIATION: Obchyslyuval'nyy tsentr AN URSR (Computer Center AS Ukr SSR)

SUBMITTED: December 16, 1959

Card 4/4

S/021/60/000/009/001/009
D210/D303

AUTHOR: Hlushkov, V.M., Corresponding Member AS UkrSSR

TITLE: On a method of analyzing abstract automatic devices

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 9, 1960, 1151 - 1154

TEXT: The aim of the paper is to find the algorithm for constructing a regular event represented in automatic device A by initial state a_1 and the set M of final state. An abstract automatic device is any object which can be in a finite number of states a_1, a_2, ... a_n and has an entry with states x_1, x_2, ..., x_m. The device is completely defined by a rectangular matrix

	a_1	a_2	...	a_n
x_1	$a_1^{(1)}$	$a_2^{(1)}$	...	$a_n^{(1)}$
x_2	$a_1^{(2)}$	$a_2^{(2)}$	...	$a_n^{(2)}$
.	.	.	.	.
x_m	$a_1^{(m)}$	$a_2^{(m)}$	...	$a_n^{(m)}$

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On a method of analyzing ...

where $a_i^{(j)}$ means a state into which the device passes from a state a_i under the action of entry x_j. Any finite set of ordered entry $x_{j1}, x_{j2}, \ldots, x_{jk}$ will be called a word. The set of all words S, which transfer the automatic device from the initial state a_1 in any of states of the set M will be called an event. The algebra of events is constructed by introducing three operations. Disjunction (S, VS_2), multiplication $S_1 \cdot S_2$. Iteration $\{S\}$. The elementary event consists of a one-letter word x_i and an empty word e. To build the alogrithm the author uses the regular expressions introduced and defined by J.M. Copy, C. Elgot and J.B. Wright (Ref. 4: Journ. Ass. Comp. Mach., 5, 2, 181, 1958). A path in A is any sequence of letters x_i and states a_j; $a_{jo}, x_{i1}, a_{j1}, x_{i2}, a_{j2}, \ldots, a_{jk-1}, x_{ik}$ a_{ik} such that any state a_{jp} by entry x_{ip} passes into a_{jp+1}. The path is simple if all a_j are distinct. The path is closed if $a_{jo} =$

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On a method of analyzing ...

a_{jk}. The path of range p is a simple closed path which starts and finishes with a_{ip} and does not fulfill the states a_{l_1}, a_{l_2}, ..., $a_{l_{p-1}}$. The complex of range p will be called the general expression, obtained by omitting in each p-range path the symbols a_{i_p}, connecting all other symbols with a sign of disjunction and taking it in integrating brackets. The proposed algorithm is as follows: starting with a complex of zero range and substituting the states a_i with the complexes of higher range until the term R is obtained, without any of the symbols $a_1, a_2, \ldots a_n$. The substitution law is defined as follows: If the path $a_1, x_{i_1} \ldots a_{i_k} x_{i_k} a_j$ belongs to a complex of p range, $(p \neq 0)$, then letter a_{j_1} is substituted by a complex of p_{j_1} range, letter a_{j_2} by a complex of $p_{j_1 j_2}$ range and

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On a method of analyzing ...

so on. The expression R will be regular and will represent the event S defined in automat A by the initial state a_1, a set M of final states. There are 1 figure and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J.M. Copy, C. Elgott and J.B. Wright, Journ. Ass. Comp., Mach., 5, 2, 181, 1958.

ASSOCIATION: Obchyslyuvalnyy centr AN UkrRSR (Computer Center AS Ukr SSR)

SUBMITTED: November 9, 1960

Card 4/4

S/041/60/012/002/002/005
C111/C333

AUTHOR: Glushkov, V.M.

TITLE: On an Algorithm of Synthesis of Abstract Automats

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1960, Vol. 12, No. 2, pp. 147-156

TEXT: The author considers abstract (finite) automats in the sense of E.F.Moore (Ref. 3) and Yu T.Medvedev (Ref. 4). He proposes an algorithm for the synthesis of these automats according to the events (in the sense of (Ref. 1)) represented by them. The starting point of the representation of events is the somewhat varied notion of the regular expression of Wright (Ref. 2). This notion, however, is systematically algebraicized on the contrary to (Ref. 2), whereby particularly the close connection of the problem considered with the representation of semigroups by permutations is emphasized. The method is used for the synthesis of an automat which represents several events. The author gives 10 longer rules and 3 theorems. He mentions B.A.Trakhtenbrot.
There are 6 references: 2 Soviet and 4 American.

SUBMITTED: November 27, 1959

Card 1/1

S/103/60/021/06/11/01[illegible]
B012/B054

AUTHORS: Glushkov, V. M., Dashevskiy, L. N., Mikitin, A. I. [illegible]

TITLE: Utilization of Electron Computers for the Automation of the Bessemer Process

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol. 21 No. 6, pp. 877 - 883

TEXT: The authors describe the automation of the control and regulation of the Bessemer process achieved after long experimental investigations which were carried out by the Dneprodzerzhinskiy vecherniy metallurgicheskiy institut (Dneprodzerzhinsk Evening Institute of Metallurgy) and the zavod im. Dzerzhinskogo (Works imeni Dzerzhinskiy). The latter two establishments investigated the available nonautomatic controlling methods of the Bessemer process, and worked out new methods suitable for automation on the basis of high-speed electron computers. A system has to be worked out by which it is possible to interrupt the blowing of rail steel at a carbon content of 0.46 - 0.58%. In consideration of the burning rate of carbon of 0.007 - 0.008% per second, the content of

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Utilization of Electron Computers for the Automation of the Bessemer Process

S/103/60/021/06/11/016
B012/B054

converter tipping must be predicted with an accuracy of ± 5 seconds. The authors describe the methods of determining this instant used on the basis of theoretical and practical investigations. This instant is predicted on the basis of information received with the use of methods of mathematical statistics. The information received by all methods for the determination of the instant is taken into account. Work for the automation of the Bessemer process was performed in two stages: First, the information apparatus was designed, mounted, and taken into operation at the Works imeni Dzerzhinskiy; it was automatically connected with the transmitters, and automatically started and stopped; in the second stage, a digital control machine was developed. This recording digital apparatus was worked out by the Vychislitel'nyy tsentr AN USSR (Computation Center of the AS UkrSSR). It is described, and its mode of operation is explained. The authors describe the operation conditions of this plant, and its construction and principal elements. It was installed at the Works imeni Dzerzhinskiy in March 1960. At present the data obtained from this plant are being evaluated mathematically together with the data of chemical analyses, and a program for the controlling machine is set up. There are 2 figures

Card 2/2

KALUZHNIN, Lev Arkad'yevich, doktor fiziko-matematicheskikh nauk; GLUSHKOV, V.M., otv. red.; POKHODZILO, P.V., red.; MATVIYCHUK, A.A., tekhn. red.

[What is mathematical logic] Chto takoe matematicheskaia logika; Kiev, 1961. 39 p. (Obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii Ukrainskoi SSR. Ser.6, no.12) (MIRA 14:11)
(Logic, Symbolic and mathematical)

RABINOVICH, Zinoviy L'vovich, kand.tekhn.nauk; BLAGOVESHCHENSKIY, Yuriy Vladimirovich, kand.fiz.-mat.nauk; CHERNYAK, Rostislav Yakovlevich, kand.tekhn.nauk; GLADYSH, Anna Leonidovna, inzh.; PARKHOMENKO, Ivan Timofeyevich, inzh.; OKUNOVA, Ivetta Petrovna, inzh.; MAYBORODA, Lidiya Aleksandrovna, inzh.; ZABARA, Stanislav Sergeyevich; GLUSHKOV, V.M., otv.red.; KISINA, I.V., red.izd-va; LISOVETS, A.M., tekhn.red.

[Specialized SESM electronic computer] Spetsializirovannaia elektronnaia schetnaia mashina SESM. Kiev, Izd-vo Akad.nauk USSR, 1961. 144 p. (MIRA 14:4)

1. Chlen-korrespondent AN USSR (for Glushkov).
(Electronic calculating machines)

PUKHOV, Georgiy Yevgen'yevich; GLUSHKOV, V.M., akademik, otv.red.; LABINOVA, M.M., red.izd-va; DAKHNO, Yu.M., tekhn. red.

[Calculus of complexes and its application] Kompleksnoe ischislenie i ego primenenie. Kiev, Izd-vo Akad.nauk USSR, 1961. 229 p. (MIRA 14:12)

1. Akademiya nauk USSR (for Glushkov).
(Complexes) (Calculus, Operational)

GL SHKOV, V. M.; M VALEVSKIY, V.A. and [illegible], V.I.

"Concerning One Algorithm in Teaching to Recognize Shapes."

Report Submitted for the Symposium on Principles in the Design of Self-Learning Systems, Kiev Ukr SSR, 5-9 May 1961

88997

S/119/61/000/001/001/013
B019/B067

9,7140

AUTHORS: Glushkov, V. M., Corresponding Member of the AS UkrSSR, Doctor of Physics and Mathematics, Derkach, V. P., Engineer

TITLE: Tube With Successive Beam Splitting

PERIODICAL: Priborostroyeniye, 1961, No. 1, pp. 1 - 3

TEXT: A new electron-beam memory with successive splitting of the beam was developed at the Vychrslitel'nyy tsentr AN USSR (Computation Center of the AS UkrSSR). In this tube, the cathode emits a broad electron beam hitting four splitter plates. These plates constitute a fine grid produced from a dielectric. Metal layers are applied to the inner side of the fine slits (Fig. 1). 50% of these metal layers are electrically connected with an upper or a lower terminal. The first plate consists of one part and screens off half of the broad electron beam. The second plate consists of two parts, each of which screens off a quarter of the electron beam. The third plate consists of four parts, and the fourth plate consists of eight parts, each of them screening off one-sixteenth

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Tube With Successive Beam Splitting

S/119/61/000/001/001/013
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of the electron beam (Fig. 2). If N plates are available, it is possible, by a proper choice of potentials in the two halves of the plates, to obtain (2^{2N}) memory cells by splitting the electron beam into two beams perpendicular to each other. This splitter-plate system causes the formation of a relief in the electron beam. The conditions for obtaining a relief and the adjustment of the relief after each computation process are studied.

Current density must be 20 microamperes per mm^2. For a tube of 64·64 memory cells with an area of 1 mm^2, the cathode area must be 12.8·12.8 cm to supply a current of about 165 milliamperes. To verify this method experimentally, a tube was designed which allows the signal to be directly observed on a screen. The tube contained a cylindrical cathode with a diameter of 30 mm, a system of splitter plates, a grid collector, and a target. The splitter plates consisted of 100μ thick high-quality mica. Their dimensions were 40·40 mm. In the center of the plate, two 1 x 20 mm, slits were punched out at a distance of 2 mm from one another and coated with conductors. Although experimental results were satisfactory, a number of mathematical and physical problems are still unsettled. The different

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Tube With Successive Beam Splitting

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location of the splitter plates produces negative effects on the accelerating field of the electrons; the effect of the capacitance of the splitter plates must be studied, etc. There are 3 figures.

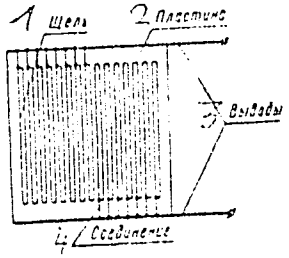

Рис. 1. Первый раздваивающий электрод.

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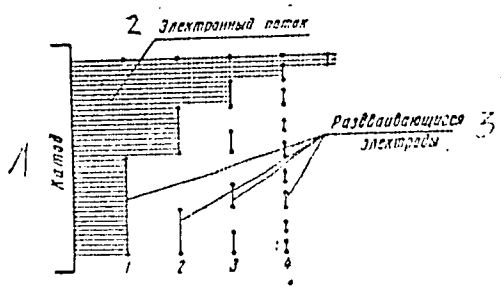

Рис. 2. Последовательное разделение луча четырьмя электродами (1 — 4).

Legend to Fig. 1: 1) Slit; 2) plate; 3) terminals; 4) connections.
Legend to Fig. 2: 1) Cathode; 2) electron beam; 3) splitter plates.

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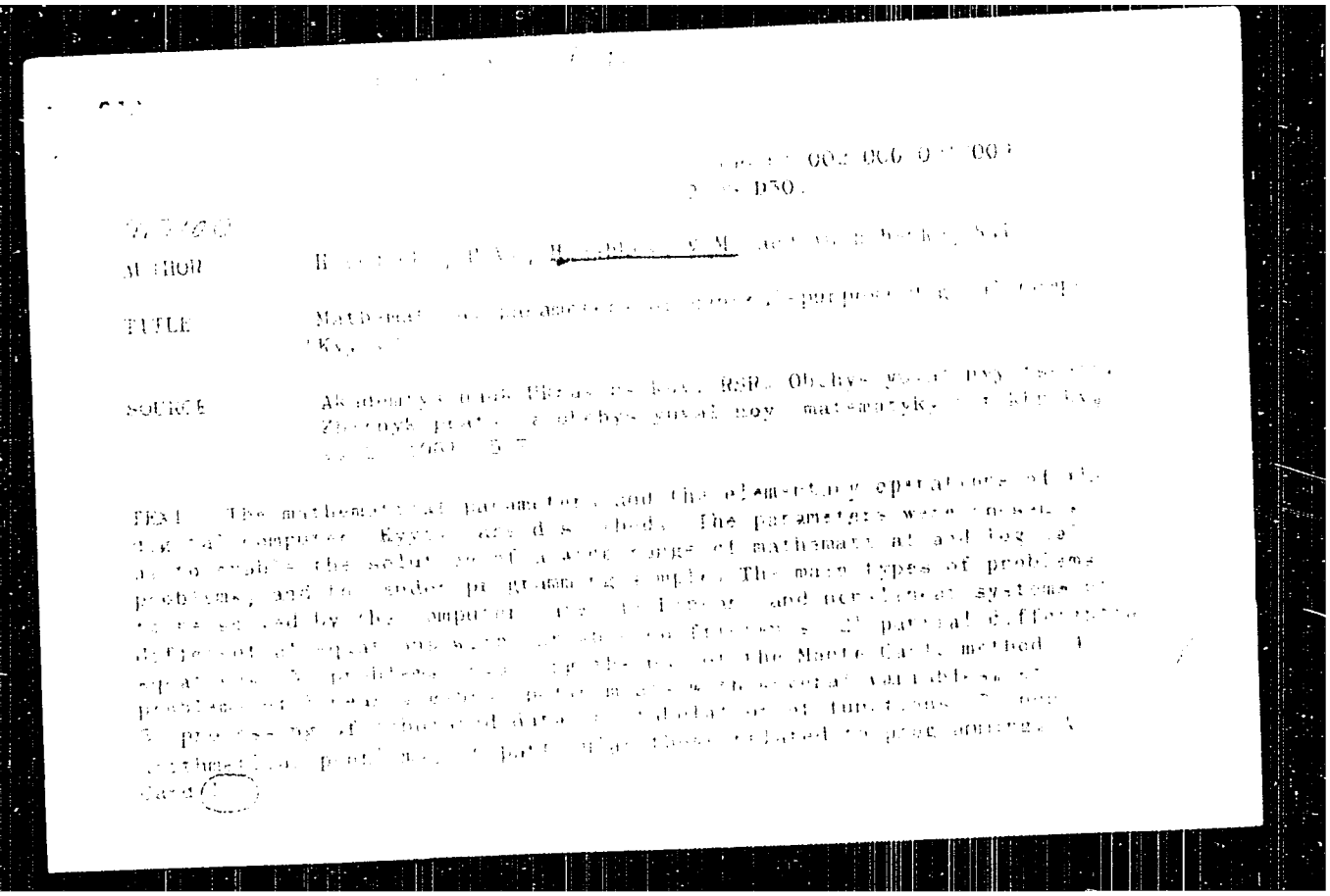
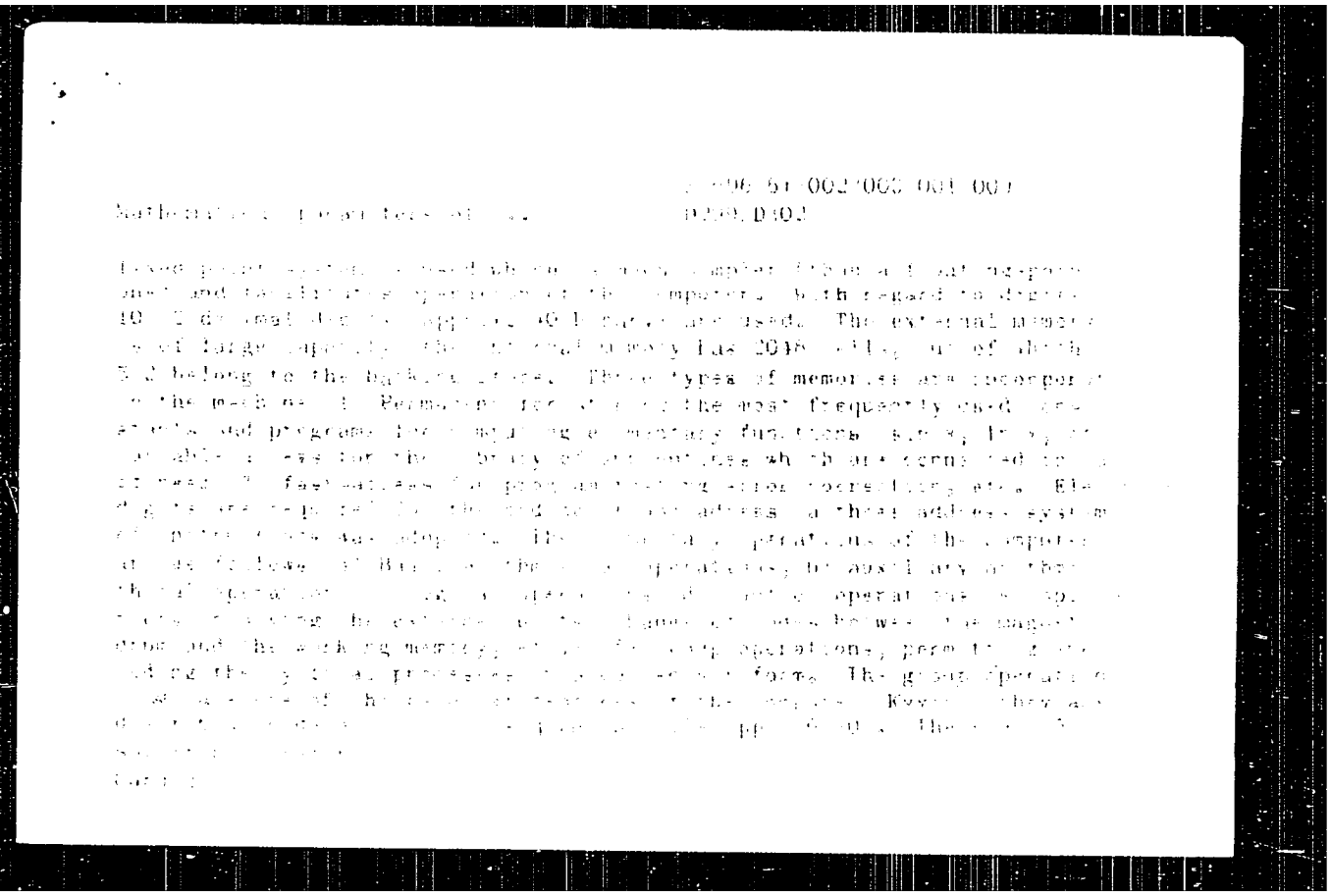


AUTHOR

TITLE

SOURCE

TEXT



GLUSHKOV, V.M. (Kiyev)

Some problems of the synthesis of digital computers. Zhur. vych. mat. i mat. fiz. 1 no.3:371-411 My-Je '61. (MIRA 14:8)
(Electronic digital computers)

29829
S/042/61/016/005/001/005
C111/C444

16.8000 (1031, 1132)

AUTHOR: Glushkov V. M.

TITLE: Abstract theory of automata

PERIODICAL: Uspekhi matematicheskikh nauk v. 16, no. 5, 196' 3 - 62

TEXT: The present paper is a detailed representation of the summary given by the author in September 1960 at the All-Union Colloquy in Sverdlovsk on the subject of general algebra. The author nearly entirely ignores the inner structure and the amounts of applications and describes an abstract algebraic theory of the automata which are characterised by the number of the states and by the rules of transition from one state into the other. Out of this conception it follows that many well-known results had to be generalised and completed before being enrolled in the developed theory. Besides of those actually well-known results the paper contains a number of new results of the author himself and of others (e. g. V. G. Bodnarchuk, A. A. Letichevskiy). These new results were attained at the Kiyev- seminary of the author on the abstract theory of automata.

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S/042/61/016/005/001/005
C111/C444

Abstract theory of automata...

§1 Homomorphism and equivalence of automata. The paper is based on a definition of the automaton by G. H. Mealy (Ref. 1: A method for synthesizing sequential circuits. Bell System Tech. Journ. 34 (1955), 1045 - 1079). The three entering sets ($\mathfrak{A}$ of the states, $\mathfrak{X}$ of the inputs, $\mathfrak{Y}$ - of the outputs) yet may be arbitrary and not necessarily finite as in ref. 1). Besides the difference between initial and non initial automata is at once stated: the automaton $A = A(\mathfrak{A}, \mathfrak{X}, \mathfrak{Y}, \delta, \lambda)$ is an initial automaton, if in $\mathfrak{A}$ a fixed element a_0 (initial state of A) is given. ($\delta = \delta(a,x)$ and $\lambda = \lambda(a,x)$ are the functions of the transitions(mapping of $\mathfrak{A} \times \mathfrak{X}$ into $\mathfrak{A}$) and of the outputs(mapping of $\mathfrak{A} \times \mathfrak{X}$ into $\mathfrak{Y}$)). Adjoining some different kinds of homomorphisms are considered e. g. the so-called $(\Psi, \mathfrak{X}, \mathfrak{Y})$-homomorphism Ψ of $A(\mathfrak{A}, \mathfrak{X}, \mathfrak{Y}, \delta, \lambda)$ is defined in $B(\mathfrak{B}, \mathfrak{X}_1, \mathfrak{Y}_1, \delta_1, \lambda_1)$ by the following three mappings: $\Psi_1 : \mathfrak{A} \to \mathfrak{B}$, $\Psi_2 : \mathfrak{X} \to \mathfrak{X}_1$ and $\Psi_3 : \mathfrak{Y} \to \mathfrak{Y}_1$ which for arbitrary $a \in \mathfrak{A}$ and $x \in \mathfrak{X}$ satisfy the following conditions: $\Psi_1(\delta(a,x)) = \delta_1(\Psi_1(a), \Psi_2(x))$, $\Psi_3(\lambda(a,x)) =$

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$= \lambda_1(\Psi_1(a), \Psi_2(x))$

Abstract theory of automata

But the $\mathfrak{A}$ - homomorphism of $A(\mathfrak{A}, \mathfrak{X}, \mathfrak{Y}, \delta, \lambda)$ in $B(\mathfrak{A}_1, \mathfrak{X}_1, \mathfrak{Y}_1, \delta_1, \lambda_1)$ is only defined by a mapping $\Psi: \mathfrak{A} \to \mathfrak{A}_1$ which satisfies $\Psi(\delta(a,x)) = \delta_1(\Psi(a), x)$, $\lambda(a,x) = \lambda_1(\Psi(a), x)$. In a similar way one distinguishes $(\mathfrak{A}, \mathfrak{X}, \mathfrak{Y})$ - and $\mathfrak{A}$ - subautomata. Then the conception of equivalence is introduced and it is proved:

Theorem 3: In the set $\mathfrak{M}$ of all automata being equivalent to each other there exists one and except of $\mathfrak{A}$ - isomorphisms only one automaton, on to which every automaton of $\mathfrak{M}$ can be $\mathfrak{A}$ - homomorphically mapped. Every state of this automaton is non equivalent to the others and the power of its state set is not larger than the power of the state set of any arbitrary automaton of $\mathfrak{M}$. The proof of this theorem consists of the description of a method for reduction of an arbitrary Mealy automaton (this one is called reduced, if two arbitrary states are not equivalent). At last the special case of the automata of Moore is considered. (In this case $\lambda(a,x) = \mu(\delta(a,x))$, where $\mu(a)$ is a unique mapping of $\mathfrak{A}$ into $\mathfrak{Y}$).

In theorem 4 it is shown that for every Mealy-automaton A there is

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Abstract theory of automata

an equivalent Moore-automaton B where in case of A being finite B might as well be chosen finite, where the number of its states is $(m + 1)n$, m being the number of the inputs and n being the number of the states in A

§2 is dedicated to the representation of the mappings in automata By $f(\mathfrak{X})$, $F(\mathfrak{X})$ one indicates free semigroups with identity which are considered as sets of words in the alphabet-sets $\mathfrak{X}$, $\mathfrak{Y}$. The mapping of $F(\mathfrak{X})$ into $F(\mathfrak{Y})$ is represented in the automaton A, if being induced by a state of A(as a mapping τ_a being induced by the state $a \in \mathfrak{A}$ of A, a mapping of the input semigroup into the output semigroup is defined which orders to an arbitrary input word p the output word $\tau_a(p) = \lambda(a,p)$) Among others it is shown: it is necessary and sufficient in order a mapping φ of $F(\mathfrak{X})$ in $F(\mathfrak{Y})$ to be representable in A, that 1) every word p of $F(\mathfrak{X})$ on which φ is defined, has the same length as the mapping $\varphi(p)$;

2) for every arbitrary words p and q out of $F(\mathfrak{X})$ there is $\varphi(pq) = \varphi(p)r$, where $r = \varphi'(pq)$ being a word out of $F(\mathfrak{Y})$.

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C111/C444

Abstract theory of automata .

A mapping satisfying these conditions is called an automaton mapping

Theorem 9: The power of the set of the states of an arbitrary automaton in which a given automaton mapping φ is representable, is not smaller than the set of the states of this mapping At last the conception of event is introduced and the representation of events by output signals is considered In the next §3 the representation of events in finite automata and the operations with events are investigated, where among others a generalisation of the algorithm of ref 16 R F McNaughton and H Jamanda (Ref : R F McNaughton and H Jamanda: Regular expressions and state graphs for automata. IRE Trans. Electr Comp , EC - 9, N1(1960), 39 - 48)) is described Based on a very general statement on the representation of regular results in finite initial automata, there is proved

Theorem 17: There exists an algorithm which permits for two arbitrary regular expressions to find out, whether the events being represented by these expressions are identic or not

§4 is dedicated to a detailed investigation of the connexion between the theory of semigroups and the theory of automata forming a

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Abstract theory of automata

further development of the announcement of the author (Ref 1: Abstraktuyye avtomaty i razbiyeniye svobodnykh polugrupp. Abstract automata and the decomposition of free semigroups. DAN (1961)) The decomposition $K = \{K_\alpha\}, \alpha \in A$ of the free semigroup F in the alphabet $\mathfrak{X}$ is called automaton decomposition, if for every $x \in \mathfrak{X}$ and every K_α the subset $K_\alpha x$ is wholly contained in a subset of K

Theorem 29: There exists an one-to-one correspondence, uniquely defined in a natural way, between the set of all connected initial automata being not isomorph with respect to the states (without input signals) with an arbitrary given input alphabet $\mathfrak{X}$, and between the set of all automata decompositions of the free semigroup with identity in the alphabet $\mathfrak{X}$

§5 is dedicated to the different compositions of the automata (direct sum, direct product, superpositions etc.) Among others there are given several results of S. Huzino (Ref : 30: On some sequential machines and experiments. Mem. Fac. Sci. Kyusyu Univ. ser. A 12, No 2 (1958), 129 - 158) and of A. A. Lutrmovskiy (Ref 31: Issledovaniya

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S/042/61/016/005/001/005
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Abstract theory of automata

polnoty dlya konechnykh aotomatov [Conditions for the completeness of finite automata]. Vychisl matem i matem fiziki no 4 (1961))

The last §6 discusses the experiments with automata and contains several results (partly generalised) of S Ginsburg (Ref 7:Some remarks on abstract machines. Trans Amer Math. Soc 26 no 2 (1960) 400 - 444) and well known older results of Moore

The author mentions A Sh. Blokh Yu T Medvedev L A Skornyakov, Yu. I Sorkin B A. Trakhtenbrot,

There are 3 figures 13 Soviet-bloc and 15 non-Soviet-bloc references The four most recent references to English language publications read as follows: J R Büchi Weak second-order arithmetic and finite automata. Zeitschr. Math. Logic and Grundlagen der Math 6. N 1 (1960) 66 - 92; S. Ginsburg Some remarks on abstract machines Trans Amer Math Soc. 96 N3 (1960), 400 - 444; R F Mc Naughton and H. Yamanada Regular expressions and state graphs for automata IRE Trans Electr Comp EC-9. N1 (1960), 39 - 48; D. S. Netherwood Minimal sequential machines IRE Trans Electr Comp . EC 8 N 3 (1959) 339 - 345.

SUBMITTED: April 21 1961

Card 7/7

GLUSHKOV, V.M.

Abstract automatons and the subdivision of free semigroups. Dokl. AN SSSR 136 no.4:765-767 F '61. (MIRA 14:1)

1. Predstavleno akademikom P.S. Novikovym.
(Groups, Theory of) (Automata)

GLUSHKOV, Viktor Mikhaylovich, akademik; YUSHCHENKO, Yekaterina Logvinovna, kand. fiz.-mat. nauk, KALUZHNIN, L.A., doktor fiz.-mat. nauk, prof., retsenzent; NEMCHINOVA, O.A., red. izd-va, SHAFETA, S.M., tekhn. red.

["Kiev" electronic computer] Vychislitel'naia mashina "Kiev": matematicheskoe opisanie. Kiev, Gostekhizdat USSR, 1962. 183 p. (MIRA 16:6)

(Electronic computers)
(Programming (Electronic computers))

PHASE I BOOK EXPLOITATION SOV/6359

Glushkov, Viktor Mikhaylovich

Sintez tsifrovykh avtomatov (The Synthesis of Programmed Digital Computers) Moscow, Fizmatgiz, 1962. 476 p. (Series: Matematicheskaya logika i osnovaniya matematiki) 15,000 copies printed.

Ed.: B. V. Biryukov; Tech. Ed.: K. F. Brudno.

PURPOSE: This book is intended for mathematicians and engineers working in the field of data processing.

COVERAGE: This monograph is part of the series "Matematicheskaya logika i osnovaniya matematiki" (Mathematical Logic and the Fundamentals of Mathematics) since in the study of the problems of the rational designing of programmed digital computers the concepts and means of mathematial logic are widely utilized. The author considers the following five major questions of synthesis

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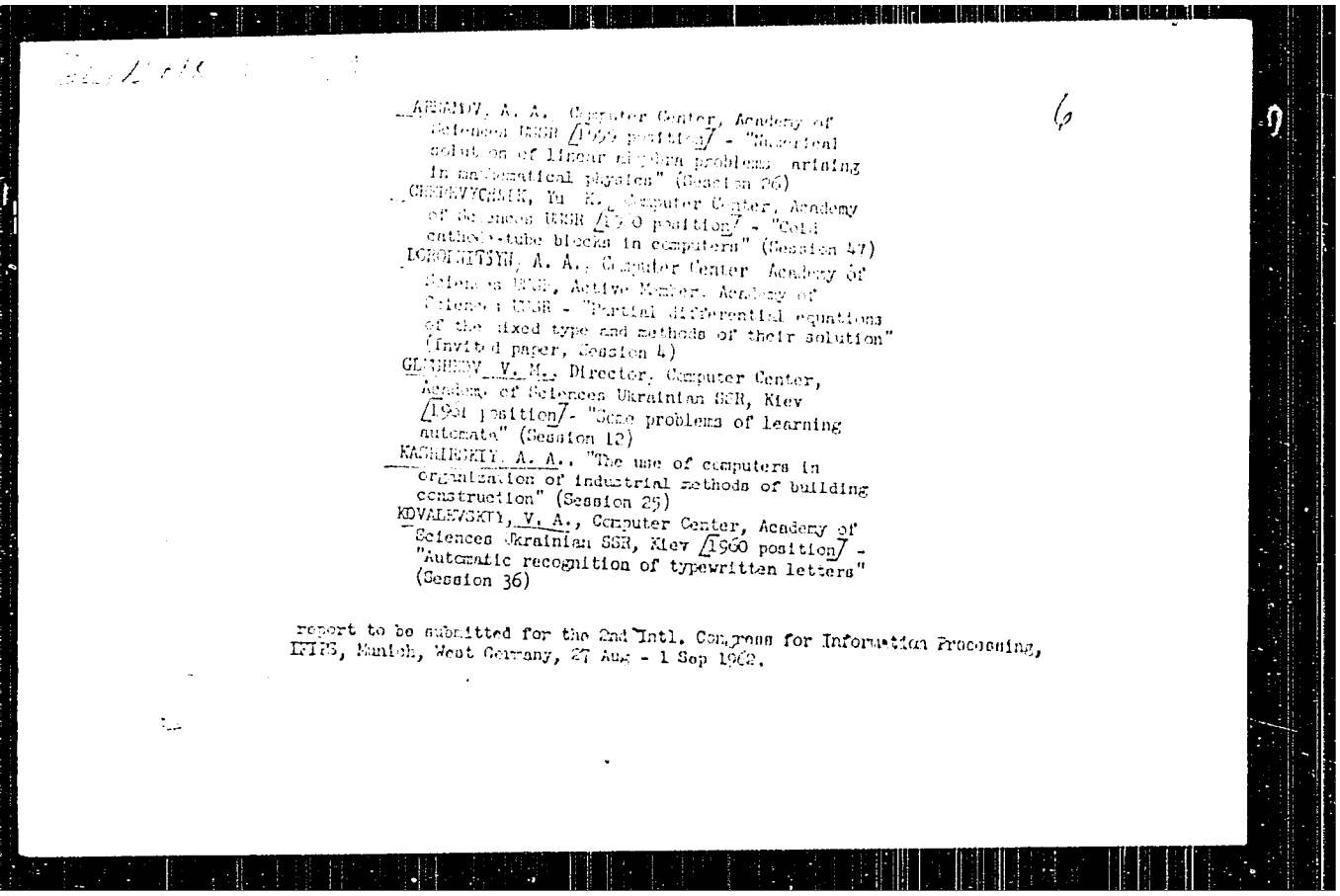
of programmed digital computers: 1) block synthesis dealing with the performance of individual units in the circuit; 2) abstract synthesis which consists in determining the memory capacity required by a given unit; 3) structural synthesis in which logical and memory elements are selected for a given unit -- and the computer as a whole -- and which uses canonical equations in order to reduce the general problem of computer or unit synthesis to the synthesis of circuits consisting of discrete elements which do not possess a memory; 4) combination synthesis which is the synthesis of these latter circuits; 5) reliability synthesis dealing with the modification of the designed circuits for the purpose of insuring the reliability of their performance. It is noted that in addition to the binary number system and the fundamentals of the theory of probability, no special mathematical knowledge is required of the reader. There are 97 references, 42 Soviet, 51 English, 3 French, and 1 German.

GLUSHKOV, V. M.

"Problems of completeness and self-organization in the abstract theory of automata"

report submitted at the Intl Conf of Mathematics, Stockholm, Sweden, 15-22 AUg 62



ARSHINOV, A. A., Computer Center, Academy of Sciences USSR [1959 position] - "Numerical solution of linear algebra problems arising in mathematical physics" (Session 36)

CHERNYYCHENK, Yu. K., Computer Center, Academy of Sciences USSR [1960 position] - "Cold cathode-tube blocks in computers" (Session 47)

LOKOTSIYEVSKIY, A. A., Computer Center Academy of Sciences USSR, Active Member, Academy of Sciences USSR - "Partial differential equations of the mixed type and methods of their solution" (Invited paper, Session 4)

GLUSHKOV, V. M., Director, Computer Center, Academy of Sciences Ukrainian SSR, Kiev [1961 position] - "Some problems of learning automata" (Session 12)

KAGANSKIY, A. A., "The use of computers in organization of industrial methods of building construction" (Session 25)

KOVALEVSKIY, V. A., Computer Center, Academy of Sciences Ukrainian SSR, Kiev [1960 position] - "Automatic recognition of typewritten letters" (Session 36)

report to be submitted for the 2nd Intl. Congress for Information Processing, IFIP, Munich, West Germany, 27 Aug - 1 Sep 1962.

GLUSHKOV, V. M.

"Digital automata systhesis problems"

report submitted for the Intl. Symposium on Relay Systems and Finite Automata Theory (IFAC), Moscow, 24 Sep-2 Oct 1962

ACCESSION NR: AT4016401 S/3049/62/000/000/0005/0018

AUTHOR: Glushkov, V. M.; Kovalevskiy, V. A.; Ry*bak, V. I.

TITLE: An algorithm for teaching a machine to recognize the simplest kind of geometric figures

SOURCE: Printsipy* postroyeniya samoobuchayushchikhsya sistem (Principles of construction of self-instructing systems). Sbornik materialov simpoziuma, 1961. Kiev, Gostekhizdat UkrSSR, 1962, 5-18

TOPIC TAGS: artificial intelligence, learning, self improving machine, cybernetics, perception, character recognition, pattern recognition

ABSTRACT: In this work there is a description of an algorithm for teaching a universal computer the recognition of the representation of several of the simplest geometrical configurations, regardless of their size and position in the field of vision. The distinguishing features of the figures are the directions of the contour lines. The drawing is characterized by a set of numbers, each of which is proportional to the number of points of the contour in a given direction. In recognition, a calculation is made of the correlation of these numbers with standard sets which describe certain "averaged" (normalized) figures. The drawing refers to a particular class of figures depending on that standard

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ACCESSION NR: AT4016401

with which maximum correlation is achieved. Although this method of describing figures does not permit correct recognition of all geometric configurations, its advantage resides in its invariability with respect to consecutive shifting of the figures. The instruction consists in the automatic determination of the standards which provide the most correct recognition of the figures. The standards are calculated by averaging the sets of directions of all the drawings used in the instruction. During the instruction phase, the class, to which a given drawing relates, is indicated by the human agent. The authors point out that, in line with the special terminology adopted by certain investigators, the algorithm described in this paper might be imagined as a two-stage perceptron. The equipment used in the experimental studies, which were made with the "Kiev" general-purpose computer, is described. The results of these tests are discussed. Orig. art. has: 6 figures.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 06Jan64 ENCL: 00

SUB CODE: CP NO REF SOV: 001 OTHER: 003

Card 2/2

ACCESSION NR: AT4016402 S/3049/62/000/000/0019/0026

AUTHOR: Glushkov, V. M.; Grishchenko, N. M.; Stogniy, A. A.

TITLE: Algorithm for the recognition of intelligent sentences

SOURCE: Printsipy* postroyeniya samoobuchayushchikhsya sistem (Principles of construction of self-instructing systems). Sbornik materialov simpoziuma, 1961. Kiev, Gostekhizdat UkrSSR, 1962, 19-26

TOPIC TAGS: artificial intelligence, syntax, data recognition, learning, self-improving machine, learning algorithm, cybernetics

ABSTRACT: The problem of recognizing intelligent sentences of one particular type is formulated in the article. The authors consider a finite set of (Russian language) words (substantives, verbs and prepositions), from which sentences can be constructed according to the scheme:

$$c_1 v'(n, c_2)^*, \qquad (1)$$

where c_1 is the subject substantive; v' is the predicate verb; n is the preposition; c_2 is the object substantive. Let there exist either a list of all the intelligent sentences which

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ACCESSION NR: AT4016402

can be composed of the words of the prescribed set according to scheme (1) or a certain "object" capable of determining whether the sentence composed according to the scheme does or does not make sense. The authors' task was to construct an algorithm which, after processing a certain body of randomly selected sentences and establishing the pairwise correlations between the words of the initial set, could, in the first place, establish with a certain probability the intelligibility of formerly unencountered sentences; secondly, the algorithm was to reduce the possibility of incorrect answers as the number of processed sentences increases by making use of an estimation of the outcome of its work on each sentence and an estimation of the possibility of employing the list of all the intelligent sentences, and, thirdly, as the number of processed sentences increases, reduce the mean time in processing one sentence in comparison with the mean time necessary to review the list of all intelligible sentences. In order to realize the last two points, the principle of instruction with a "teacher" and the principle of self-instruction were used when formulating the algorithm. The authors describe in detail the development of the algorithm. Two stages are distinguished: 1) from the set of sentences which can be formed according to scheme (1) by using all the words of the initial group, (the number of which equals $nm(n^k + n + 1)$, where n, m and k are the number of initial substantives, verbs and prepositions, respectively), the smallest subset is selected which contains all the permissible sentences; 2) from the subset of all permissible sentences

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ACCESSION NR: AT4016402

sentences the intelligent expressions are selected. Orig. art. has: 3 formulas.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 06Jan64 ENCL: 00

SUB CODE: CP NO REF SOV: 000 OTHER: 000

Card 3/3

ACCESSION NR: AT4016405 S/3049/62/000/000/0063/0072

AUTHOR: Glushkov, V. M.; Kovalevskiy, V. A.; Ry*bak, V. I.

TITLE: Universal device for the investigation of image-recognition algorithms

SOURCE: Printsipy* postroyeniya samoobuchayushchikhsya sistem (Principles of construction of self-instructing systems). Sbornik materialov simpoziuma, 1961. Kiev, Gostekhizdat UkrSSR, 1962, 63-72

TOPIC TAGS: cybernetics, character recognition, optical character recognition, image recognition, pattern recognition

ABSTRACT: The authors propose a universal device for the study of image-recognition algorithms, the purpose of which is to introduce information regarding a graphic image (drawing, plan, etc.) into a computer. The device is controlled by the computer, a fact which makes it possible to simulate any kind of scanning of a drawing executed with India ink, printer's ink or pencil on paper. In this case, there is no need to transfer the drawing to the memory of the computer; i.e., to burden the memory with unprocessed information, since it is possible to refer to any point of the drawing at the necessary moment. The device is capable of distinguishing 16 gradations of grayness, thus making it possible to process not only line drawings, but half-tone work as well. The instrument is designed to be used

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ACCESSION NR: AT4016405

with the "Kiev" computer; this universal digital machine operates with a 41-bit code, with a three-address command system and a mean speed of 10,000 mathematical operations per second. The machine, and its subunits, are described in detail in the article. The author reports that a form of the proposed universal device has been in operation since December of 1960, and has been successfully used for the study of (1) the algorithm used in instructing a machine to recognize geometrical figures, (2) the recognition of typewritten digits in the presence of printing defects and (3) the reliability of the automatic reading of graphs. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 00	DATE ACQ: 06Jan64	ENCL: 00
SUB CODE: CP	NO REF SOV: 002	OTHER: 006

Card 2/2

GLUSHKOV, V.M.; DERKACH, V.P.

New principles for constructing the unilateral memory of electronic computers. Avtom.i prib. no.1:26-29 Ja-Mr '62. (MIRA 15:3)

1. Vychislitel'nyy tsentr AN USSR.
(Electronic calculating machines)

S/102/62/000/001/005/007
D201/D302

9,2100

AUTHOR: Mlushkov, V.M. (Kiyev)

TITLE: A principle of design of a universal reading automatic device

PERIODICAL: Avtomatyka, no. 1, 1962, 55-64

TEXT: The author describes a variant of a pattern recognition machine design which he considers to be the simplest possible from the view point of simplifying the decoding of secondary algorithms. The instrument consists of a universal electronic digital computer which, instead of the four normal memories, has four systems: The vertical deflection register (VR), the horizontal deflection register (HR), the spot dimension register (SR) and the brightness register (BR). The Vr, Hr and SR allow for both storing and reading of information, the BR allows only for reading. All registers are connected through a transmitter to an industrial type TV arrangement. While the coded signals from HR and VR determine the deflection of the TV tube beam, the SR signal acts on the focusing system, the one digit corresponding to the minimum dimensions of the reading spot and the maximum code

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number corresponding to the least focussing (max. spot dimensions). With zero signal value the reading beam is suppressed. The dimensions of the drawing are first determined and the brightness and spot dimensions pick-ups, adjusted, after which the scanning beam is aligned with the center line of the drawing and by scanning it reproduces the characteristics of the individual parts of the drawing (length and curvature of the line, characteristic points etc). From the results obtained the generalized 'sign' of the reproduced drawing is determined (the invariant) and as the last stage of the process this invariant is compared with the possible limits of its changes, at which the analyzed drawing gives the same meaning or describes the same object. The table of the corresponding limits (boundary table) of a given set of ideas is stored in the memory of the computer. The analysis of the algorithm of pattern recognition given above shows that the maximum accuracy of reproduction is required when determining the slope of a line at a given point. In the proposed method the number of binary digits determining this angle in the code does not exceed 3 + k, where k - the max. number of positive digits in the brightness code. It is

S/102/62/000/004/005/007
D201/D302

A principle of design of ...

stated in conclusion that the described pattern recognition method is intended for recognition of complex contours and half-tone drawings and not for that of numbers or letters which can be accomplished in a much simpler manner. There are 5 non-Soviet-bloc references. The 4 most recent references to the English-language publications read as follows: G.P. Dinneen, Programming pattern recognition, Proc. Western Joint Computer Conf., 1955, pp. 94-100; R.A. Kirsch, L. Chan, L.C. Ray, G.H. Urban, Experiments in processing pictorial information with a digital computer, Proc. Eastern Joint Computer Conf., 1957. XII, pp. 221-229; M. Kloomok, The use of computers for automatical reading, Automation Progress, 1957, 2, no. 4, pp. 158-163; R.L. Grimsdale, F.H. Summer, C.J. Tunis and T. Kilburn, A system for the automatic recognition of patterns, Proc. IEE, v. 106, B, no. 28, 1959, pp. 210-221.

SUBMITTED: April 15, 1961

Card 3/3

S/271/63/000/003/009/049
A060/A126

AUTHORS: Glushkov, V.M., Kovalevskiy, V.A., Mikhaylevich, V.S.

TITLE: On the reliability of discrete automats. Summary

PERIODICAL: Referativnyy zhurnal, Avtomatika, telemekhanika i vychislitel'naya tekhnika, no. 3, 1963, 48, abstract 3A278 (Tr. VI Vses. soveshchaniya po teorii veroyatnostey i matem. statistike, 1960. Vil'nyus, Gos. izd-vo polit. i nauchn. lit. LitSSR, 1962, 209 - 210)

TEXT: The article gives the conclusion to the paper on the influence of malfunctions of separate components on the functioning of discrete automats and cites certain hypotheses as to the nature of malfunctions. The authors note the value of J. von Neumann's work (Probabilistic logic and the synthesis of reliable organisms from unreliable components, in collection Avtomaty, Moscow, il., 1956, 68 - 139) which demonstrates the possibility of synthesizing reliable organisms from unreliable (i.e., such as admit of malfunctions) components, as well as the work of Claude Shannon and A.F. Moore (Reliable networks from unreliable relays, in Kiberneticheskiy sbornik, v. 1, Moscow, il., 1960, 109 - 148)

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S/271/63/000/003/009/049
A060/A126

On the reliability of discrete automats. Summary

which studies the reliability of discrete automats composed of relay-contact elements. The method of investigating the nature of the random malfunctions consists in the analysis of the solution of equations describing the operation of the automats while taking into account the stochastic processes occurring in the machine. One of the possible causes of malfunctions in electronic computers may be the electric fluctuations occurring in various components of the network, and also the asynchronicity of operation of the separate units of the machine. Qualitative estimates are obtained for the probability of malfunctions in actual devices. The investigations carried out constitute an important stage in the solution of the problem of investigating the dynamic reliability of discrete automats.

M. M.

[Abstracter's note: Complete translation]

Card 2/2

AUTHOR: [illegible]ushkov, V.N.

TITLE: [illegible] of learning [illegible] of [illegible] of [illegible] perceptrons

PUBLICATION: [illegible] matematicheskoy
[illegible], V. [illegible], [illegible], 1962, 227 - [illegible].

TEXT: The [illegible] of [illegible] by [illegible] of Joseph [illegible] of practically [illegible] [illegible] and [illegible] perceptrons considered which possess [illegible] properties, but that the [illegible] offered in this paper is free from such defects. Basic definitions given by Rosenblatt and Joseph are quoted in detail. [illegible] of stimulation is chosen for the [illegible] system, by which the weights of those inputs (a-elements) increase by a and the weights of other inputs decrease by b after an image has been shown to the perceptron. Four theorems are proved and three examples of the application of the theory to behavior problem of perceptrons are given. There are 1 table and [illegible] bibliographic references. The 4 most recent references to the English-language publications read as follows:

Card 1/2

S/[illegible]/62/002/002/009/014
D258/D301

Theory of learning of a ...

F. Rosenblatt. Two theorems of statistical separability in the perceptron. Mechanisation of thought processes, vol. 1, 1960, 421, no. 3, 421 - 456; R.D. Joseph. A proof on the perceptron program. Proc. Nat. Electronics Conf. Volume 17, 1961, 1 , 94 - 95; R.D. Joseph. On predicting perceptron performance. IRE Intern. Conv. Rec. 1960, no.2, 71 - 72; L.G. Roberts, Pattern recognition with an adaptive network. IRE Intern. Conv. Rec. 1960, no. 2, 66 - 70.

SUBMITTED: December 1, 1961

Card 2/2

GLUSHKOV, V.M. (Kiyev)

Self-organizing systems and the abstract theory of automata.
Zhur.vych.mat.i mat.fiz. 2 no.3:459-466 My-Je '62. (MIRA 15:7)
(Automatic control) (Information theory)
(Electronic calculating machines)

42758
S/208/62/002/006/006/007
B112/B186

AUTHOR: Glushkov, V. M. (Kiyev)

TITLE: Selfinstruction in the perceptron

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 2, no. 6, 1962, 1102-1110

TEXT: A discrete symmetrical α-perceptron B is considered, which is able to distinguish two forms P and Φ. The form P consists of n horizontal lines, and the form Φ of n vertical lines. Each of these 2n lines constitutes a single mapping. For this perceptron the following theorem is derived: For any positive number Δ there is a number s such that the perceptron B in the state of selfinstruction will conserve the initial classification of mappings with a probability $p > 1 - \Delta$, if the lower bound of the absolute values of the initial conditions exceeds the number s, and if all mappings have the same probability. Besides the perceptron B, a symmetrical β-perceptron C is considered, the characteristic matrix of which is a diagonal matrix. The perceptron C is shown to have no

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Selfinstruction in the perceptron

S/208/62/002/006/006/007
B112/B186

ability for selfinstruction. This is generally valid if the initial classification of the mappings refers all mappings to a unique form. The study was made in order to specify the actual limits of selfinstruction in perceptrons on a strict mathematical basis in reply to the analysis of the behavior of perceptrons made by F. Rosenblatt in his papers. Two theorems of statistical separability in the perceptron. Symp. Mechaniz. Thought Proc., Teddington, England, 1958, Paper 1-3, 3-22. There are 2 figures.

SUBMITTED: May 25, 1962

Card 2/2

GLUSHKOV, V.M. [Hlushkov, V.M.], akademik

New developments in cybernetics. Avtomatyka 7 no.3:85-90 '62.
(MIRA 15:6)

1. AN USSR.

(Cybernetics)

44289

S/165/62/007/012/004/021
D234/D308

9.7140

AUTHORS: Klushkov, V.M. and Derkach, V.P.

TITLE: Quickness of response of tubes with consecutive beam bifurcations

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 12, 1962, 1280 - 1285

TEXT: The above tubes have been described by the authors (Priborostroyeniye no. 1, 1961; Avtomatika i priborostroyeniye, no. 3, 1960). It is found that the beam switching is slowed down owing to the capacity formed by a part of conducting slots of the gratings. In the worst case the switching time increase is proportional to the sum of two largest adjacent resistances, multiplied by the capacity due to 1/4 of slots in each electrode. This capacity is difficult to determine analytically; a method based on graphical representation of the field distribution is recommended, and examples are given. If there are no more than 1024 memory elements in the grating, millions of switch-

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Quickness of response of tubes ...

ings per second are possible. There are 3 figures.

ASSOCIATION: Instytut kibernetyky AN URSR, Kyyiv (Institute of Cybernetics, AS UkrSSR, Kiev)

SUBMITTED: June 2, 1962

Card 2/2

GLUSHKOV, V. [Hlushkov, V.]

In the light of cybernetics. Nauka i zhyttia 12 no.5:17-18 My '62. (MIRA 15:7)

1. Vitse-prezident AN USSR.
(Cybernetics)

GLUSHKOV, V.M., akademik

Calculating machines and automatic control in industry. Vest. AN SSSR 32 no.4:86-90 Ap '62. (MIRA 15:5)

1. AN USSR.
(Electronic calculating machines) (Automation)

MALINOVSKIY, B.N.; GLUSHKOV, V.M., akademik, retsenzent; MASLENNIKOV, V.M., inzh., red.; STROGONOV, L.P., red. izd-va; SOKOLOVA, T.F., tekhn. red.

[Digital control machinery and automation of production processes] TSifrovye upravliaiushchie mashiny i avtomatizatsiia proizvodstva. Moskva, Mashgiz, 1963. 287 p. (MIRA 17:3)

1. Akademiya nauk Ukr.SSR (for Glushkov).

AYZERMAN, M.A.; BRAVERMAN, E.M.; GLUSHKOV, V.M.; KOVALEVSKIY, V.A.; LETICHEVSKIY, A.A.

Theory of image recognition and self-teaching systems. Izv. AN SSSR. Tekh. kib. no.5:98-101 S-O '63. (MIRA 16:12)

GLUSHKOV, V.M.

Some prospects for the development and use of teaching machines. [Trans. from Kibernetika, v. no. 4:365-373 Jl-Ag '63. (MIRA 16:11)

GLUSKOV, V.M.[Glushkov, V.M.]; SZASZ, Ferenc, a matematikai tudomanyok kandidatusa [translator]

Abstract theory of automatic machines. Pt. 1. Mat kozl MTA 13 no.3:287-309 '63.

GLUSHKOV, V.M., akademik

Economics and automation. Vest. AN SSSR 33 no.10:11-14 O '63.
(MIRA 16:11)

1. AN UkrSSR.

S/026/63/000/002/001/007
A004/A126

AUTHOR: Glushkov, V. M., Academician of the Academy of Sciences UkrSSR (Kiyev)

TITLE: Simulation of mental processes

PERIODICAL: Priroda, no. 2, 1963, 3 - 13

TEXT: The author presents a detailed survey on the possibilities of simulating mental processes with the aid of modern cybernetic techniques, which would serve as a basis for automating many kinds of intellectual activity of Man. He distinguishes two basic forms of such a simulation, viz. the direct and indirect, or phenomenological form. In the first case, the main attention is focussed on Man's brain, thus the simulation of mental processes proper is obtained as a result of a simulation of the brain. In the latter case, i. e. in indirect simulation, only the general course of mental processes is reproduced, the regularities of changing over from one thought to another. The author gives a description of the brain model and its functioning, presents a number of examples of algorythmic descriptions and coding of mental processes, and attempts to answer

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S/026/63/000/002/001/007
A004/A126

Simulation of mental processes

the question, whether it is possible to automate scientific work. He then describes the simulation of processes of identification and discrimination, comments in detail on the practice of training machines for performing mental operations, and states that everything that has been achieved in this field hitherto is nothing but the first steps towards developing a general theory on self-organizing systems as a basis for the simulation of mental processes. There are 7 figures.

ASSOCIATION: AN USSR (AS UkrSSR), Kiyev

Card 2/2

L 31274-65 EEC-4/EED-2/EWT(d)/EWP(1) Pg-4/Pk-4/Po-4/Pq-4 LJP(c)
GG/BB

ACCESSION NR: AR5004814 S/0044/64/000/011/V030/V030

AUTHOR: Glushkov, V. M.

SOURCE: Ref. zh. Matematika, Abs. 11V166

TITLE: Gnosiological nature of information modeling

CITED SOURCE: Vopr. filosofii, no. 10, 1963, 13-18

TOPIC TAGS: automaton, cybernetics

TRANSLATION: Scientific modeling of any object, in the author's opinion, is "none other than fixation of some level of recognition of this object, making it possible to describe not only its construction but also to predict its behavior (with one degree of approximation or another). Unlike ordinary physical modeling, it is natural to call such modeling informational, emphasizing by the same token

that we are dealing with information concerning a given object which

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is at our disposal."

The means of fixing any concrete informational model, in the author's opinion "are languages, not only human languages, which are studied by traditional linguistics, but arbitrary artificial languages, which are constructed during the course of accumulation

versal instrument for informational modeling," although its structure shows very little similarity to the structure of the brain. The property of the universality of the computer is proved on the basis of the idea of "coding of alphabets of arbitrary languages in terms of the alphabet of any one language" (if the latter contains more than one letter) and the ideas of "resolving the arbitrary rules for the

even such projects as the production of an "artificial man," a

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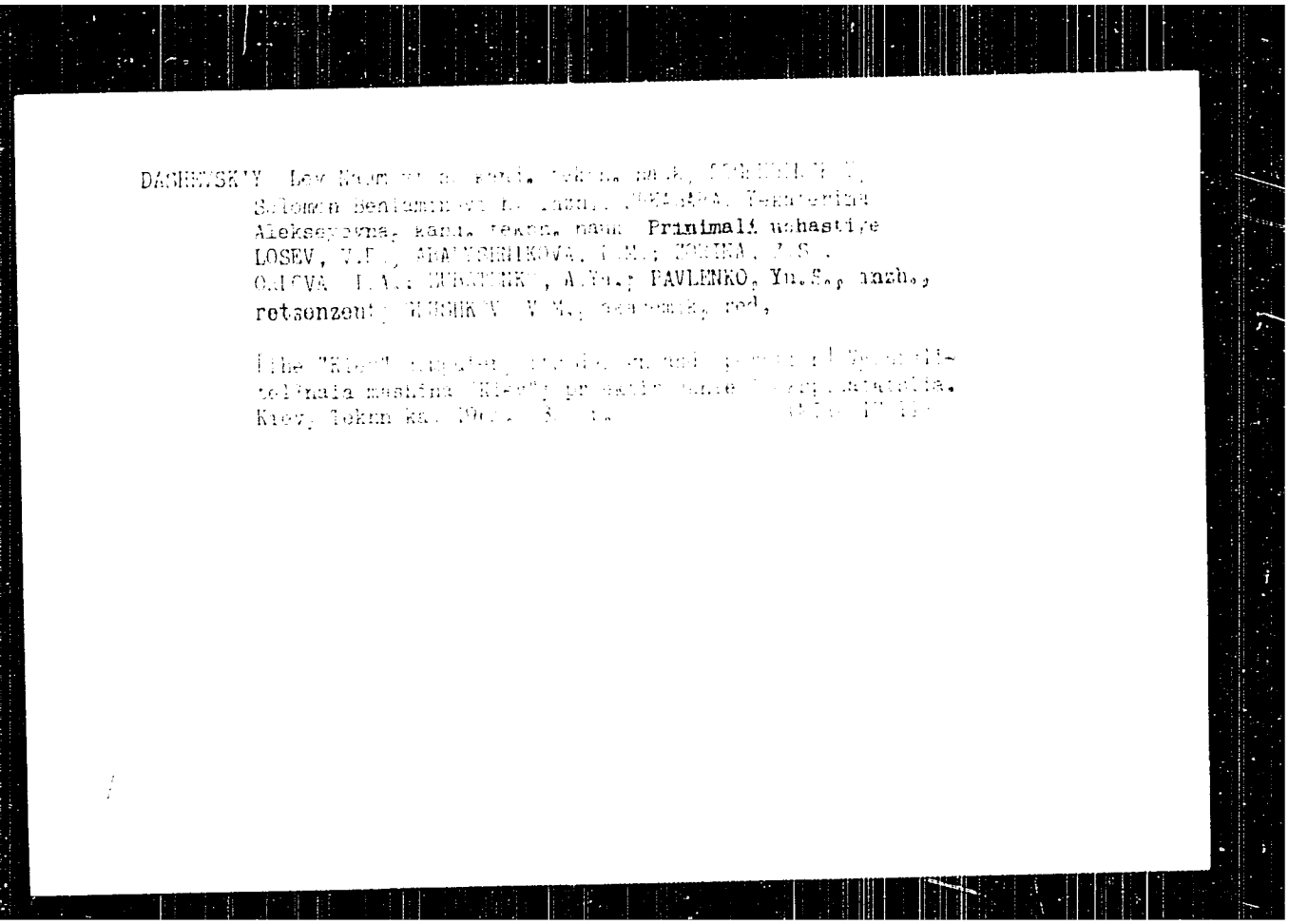
ACCESSION NR: AR5004814

society consisting of machines, etc. (around which an air of unhealthy sensationalism is frequently created"), these projects "become immediately inconsistent, as soon as we change over from the abstract-technical point of view to the position of actual reality," since "in any really existing and developing human society everything that is produced by human hands, including the most perfect automata, are none other than production tools and cannot be equivalent to hu-

Card 1 4/4



DAGNEVSKIY Lev Kuzmich, kand. tekhn. nauk, [illegible]
Solomon Benjaminovich [illegible], PASHKOVA, Tamara Ivanovna
Alekseyevna, kand. tekhn. nauk. Primimali uchastiye
LOSEV, V.F., ARAKCHEYEVA, I.N., ZOLINA, Z.S.,
OLIYNYK, I.A., ZHUKOVSKIY, A.Ya., PAVLENKO, Yu.S., inzh.,
retsenzent; MISHKIN, V.M., kandidat, red.

[illegible] "Kiev" [illegible]
[illegible] "Kiev" [illegible]
Kiev, Tekhnika, 19[illegible]. [illegible] p.

L 33605-65 EEC-4/EED-2/EWT(d)/EWP(1) Pg-4/Pk-4/Po-4/Pq-4 IJP(c) OG/BB

ACCESSION NR AM4043711 BOOK EXPLOITATION

47 S/
43+1

Glushkov, Viktor Mikhaylovich

Introduction to cybernetics (Vvedeniye v kibernetiku), Kiev, Izd-vo AN USSR, 1964, 323 p. illus., biblio. 15,000 copies printed. (At head of title: Akademiya nauk Ukrainskoy SSR. Nauchnyy sovet po kibernetike)

TOPIC TAGS: digital computer, selforganizing system, algorithm, perceptron, computer programming, Boolean function

PURPOSE AND COVERAGE: This book collects and generalizes the material necessary to such sections of modern cybernetics as the theory of digital computers, the [illegible] machines, and the theory of discrete self-organizing

L 33605-65
ACCESSION NR AM4043711

of mathematicians and researchers in many specialties who desire to become acquainted with the problems of modern cybernetics.

TABLE OF CONTENTS [abridged]:

SUBMITTED: 07Dec63 SUB CODE: DP, MA

NO REF SOV: 040 OTHER: 043

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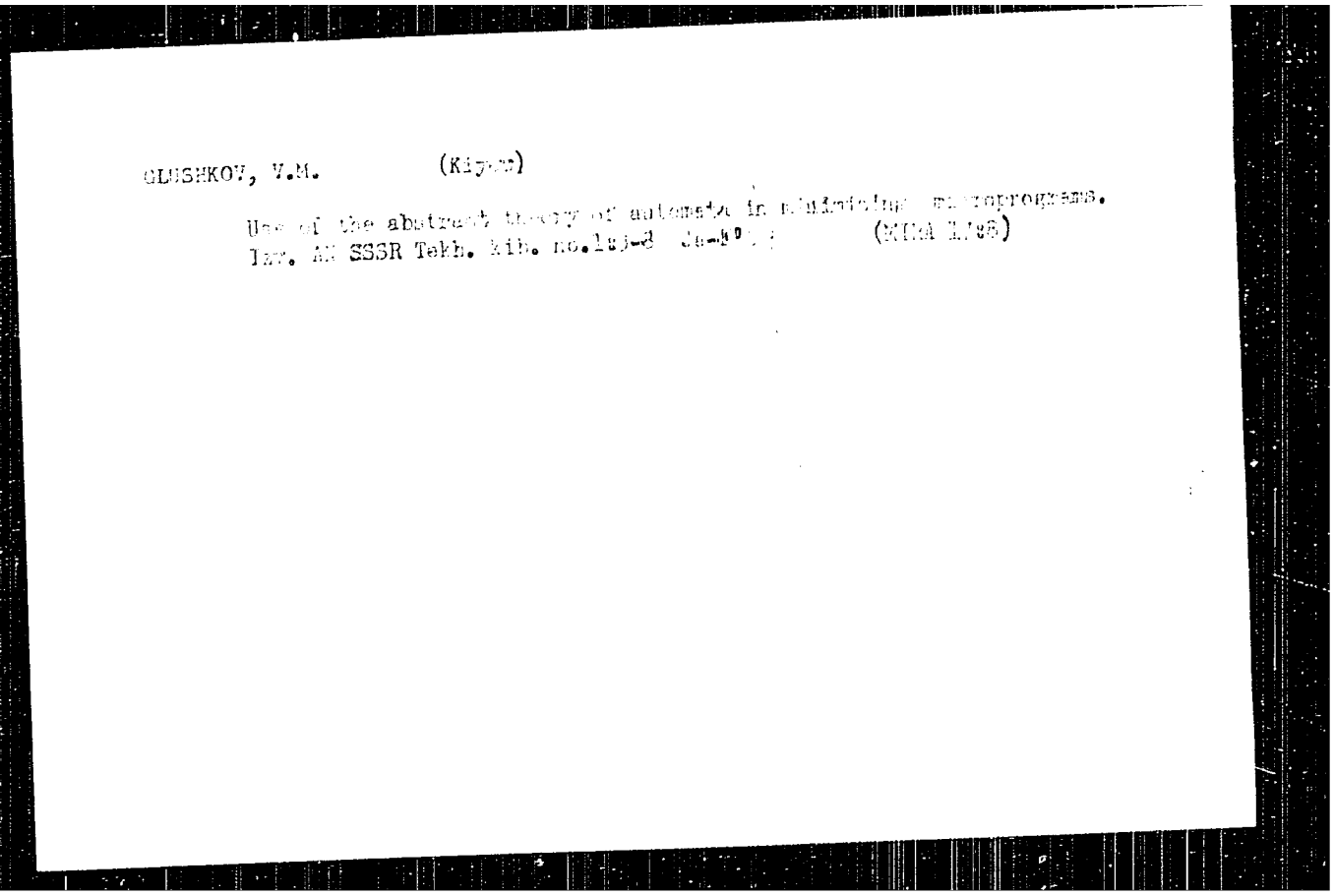


GLUSHKOV, V.M. (Kiyev)

Use of the abstract theory of automata in solving mathematical programming problems. Izv. AN SSSR Tekh. kib. no.1:3-29 Ja-F '60. (MIRA 13:6)

L 58819-65

ACCESSION NR: AR5000584 S/0271/64/000/009/B059/B060
681.142:62

SOURCE: Ref. zh. Avtomat., telemekh. i vychisl. tekhn. Sv. t., Abs. 9B352

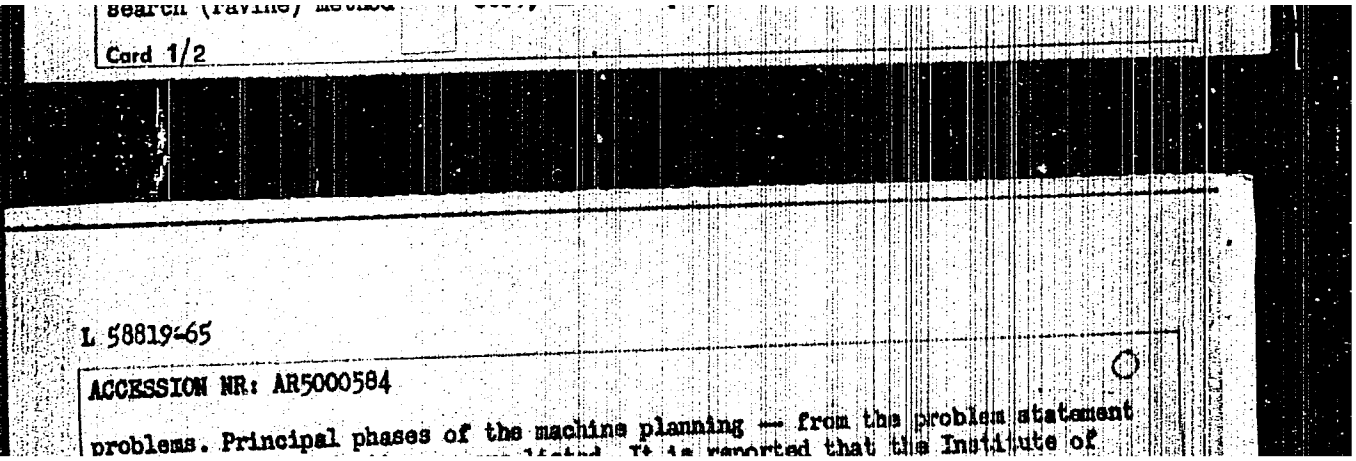
AUTHOR: Glushkov, V. M.

TITLE: Using digital computers for solving optimal-design problems

CITED SOURCE: Tr. Vses. n.-i. in-ta transp. str-va i In-ta kibernet. AN USSR, vyp. 51, 1964, 5-10

TOPIC TAGS: optimal designing, optimal planning, computer optimal designing, computer optimal planning, computer ER design

TRANSLATION: It is noted that the digital computers permit selecting the best of all possible variants in designing and planning work. Using digital computers requires



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ACCESSION NR: AR5000584

problems. Principal phases of the machine planning -- from this problem statement

It is reported that the Institute of

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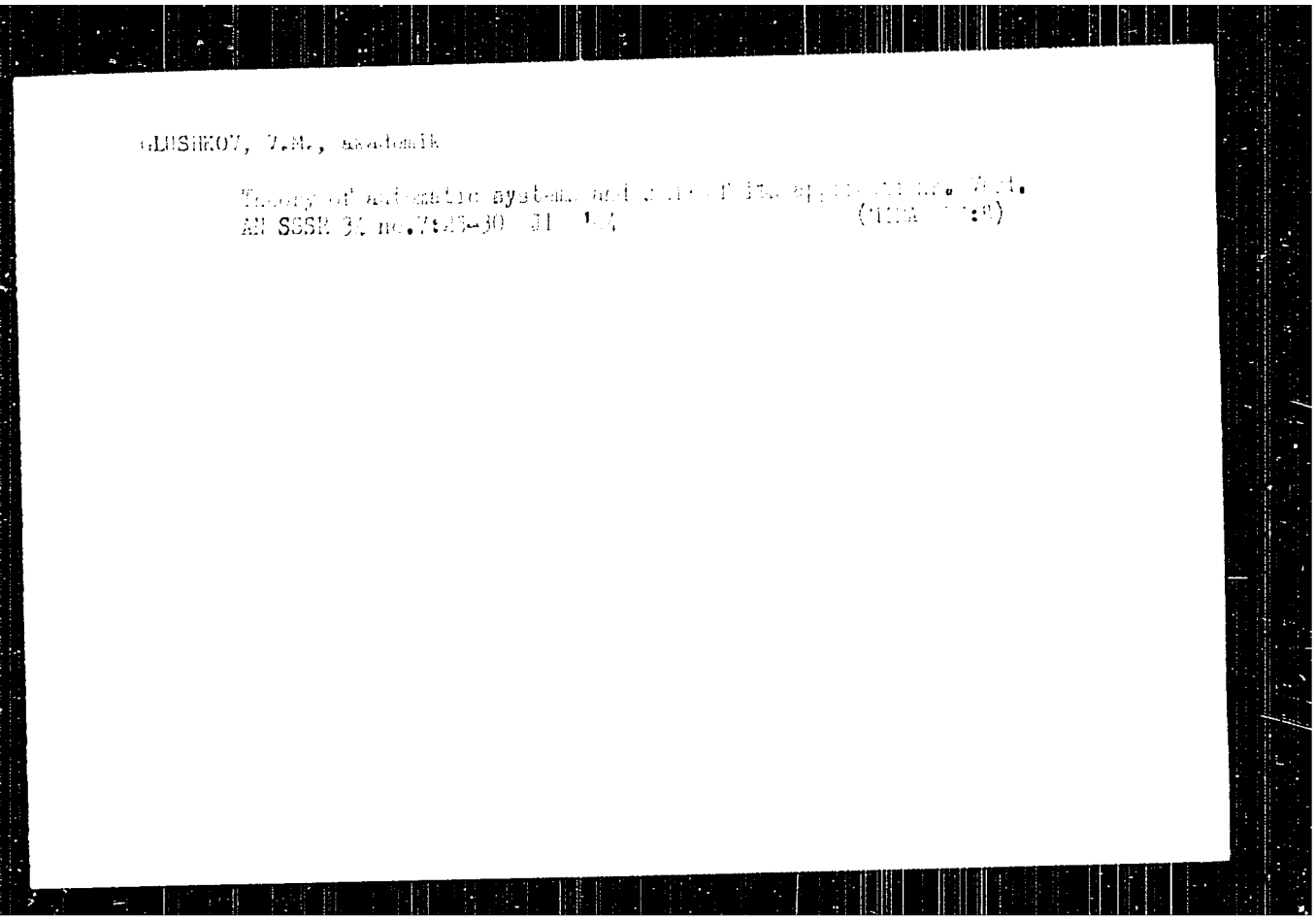
GLUSHKOV, V.M. [Glushkov, V.M.]

Abstract theory of automatic devices. Ukr. mat. zhur. 13A no. 1:71-110 '61.



GLUSHKOV, V.M., akademik

"Theory of automatic systems and [illegible]" Dok. AN SSSR 31 no.7:625-30 '41 (MIRA [illegible])

GLUSHKOV, Viktor Mikhaylovich, akademik; FAYNBOYM, I.B., red.

[Cybernetics and mental work] Kibernetika i umstvennyi trud. Moskva, Znanie, 1965. 45 p. (Novoe v zhizni nauke, tekhnike. IX Seriia: Fizika, matematika, astronomiia, no.15) (MIRA 18:7)

GLUSHKOV, V.M., [illegible] red.; [illegible], A.I., [illegible]; [illegible], A.A., red.; BLAGOVESHCHANSKIY, [illegible]; [illegible]; YERSHOV, A.P., red.; LYAPUNOV, A.A., red.; [illegible], I.S., red.; [illegible], red.; [illegible], red.; [illegible], A.A., red.; TIMOFEYEV, SAMOKHVALOV, K.G., red.; [illegible], A.A., red.; SHCHERBAN', [illegible]; [illegible], A.A., [illegible], red.; [illegible], red.; [illegible]VA, [illegible], red.

[illegible]
[illegible] 196[illegible]
(MIRA [illegible])

1. Akademiya nauk [illegible]

puters

SOURCE: Kibernetiks, no. 1, 1965, 3-11

TOPIC TAGS: infinite automaton, automaton theory, computer structural design, digital computer, automatic control system, memory design

ABSTRACT: The development of the abstract theory of automatic control devices (automata) is presently in the direction of infinite automata. This trend was prompted partly by the development of the abstract theory of languages. The present paper develops appropriate concepts of the theory of infinite automata (like the abstract register, periodically-defined transformations, register completion, adjusting transformations, etc.) which [illegible] a more precise formulation of a whole set of practical problems of the synthesis [illegible] the solution of such

devoid of any additional specifications. Such an approach

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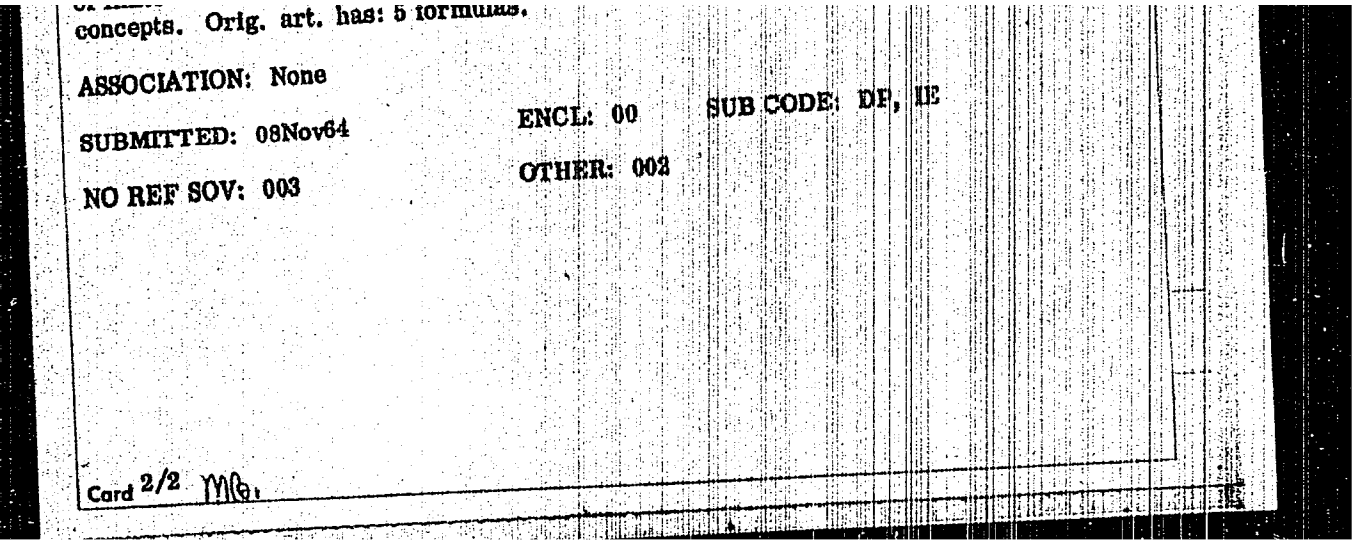
L 54573-65
ACCESSION NR: AP5012117

automaton which would be so general that its direct application to various types of practical [illegible] inefficient. Consequently, a specialization of the states is [illegible] divided into cells



concepts. Orig. art. has: 5 formulas.

ASSOCIATION: None

SUBMITTED: 08Nov64 ENCL: 00 SUB CODE: DP, IE

NO REF SOV: 003 OTHER: 002

Card 2/2 MG

L 54581-65 EWT(d)/EWT(m)/EWP(w)/EWP(v)/T-2/EWP(k)/EED-2/EWP(l)/EWA(h)
Pq-4/Pf-4/Pg-4/Peb/Pk-4 IJP(c) BB/GW/EM/GG
ACCESSION NR: AP5012125 UR/0378/65/000/001/0074/0082
51:681.14

AUTHOR: Glushkov, V. M.; Letichevskiy, A. A.; Stognii, A. A.

TITLE: Input languages for an engineering design computer

SOURCE: Kibernetika, no. 1, 1965, 74-82

TOPIC TAGS: computer language, engineering design computer, modified ALGOL-60, computer programming

ABSTRACT: An input language for a computer earmarked for engineering computations is described. The machine should: 1) handle limited problems since it is able to store a small amount of initial data; 2) use a simple input language and readily accept initial data; 3) handle the problem completely automatically; 4) incorporate a convenient (partially

article presents: 1) the basic symbols, identifiers, and numbers, 2) [illegible] expres-

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ACCESSION NR: AP5012125

sions, 3) the operators, 4) a descriptive part, and 4) a program outline with examples. Orig. art. has: 8 formulas.

ASSOCIATION: None

SUBMITTED: 16Nov64 ENCL: 00 SUB CODE: DP

NO REF SOV: 000 OTHER: 000

GLUSHKOV, V.M., akademik, red.; KUL'SKIY, L.A., red.; TESLYA, L.A., red.; KRIVORUCHKO, P.F., tekhn. red.

[Intensification and automation of processes regulating water quality] Intensifikatsiia i avtomatizatsiia protsessov regulirovaniia kachestva vody. Kiev, In-t tekhn. informatsii, 1960. 201 p. (MIRA 17:3)

1. Akademiya nauk Ukr.SSR (for Glushkov). 2. Chlen-korrespondent AN Ukr.SSR (for Kul'skiy).

GLUSKHOV, V.M. [Hlushkov, V.M.]

Young, omnipresent and powerful... Znan. ta pratsia no.1:3-4 Ja '63.
(MIRA 16:3)

1. Vitse-prezident AN UkrSSR, i direktor Instituta kibernetiki AN UkrSSR.
(Cybernetics)

S/0280/64/000/001/0003/0008

ACCESSION NR: AP4015286

AUTHOR: Glushkov, V. M. (Kiev)

TITLE: Using the abstract automaton theory for minimizing microprograms

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 1, 1964, 3-8

TOPIC TAGS: computer microprogram, computer microprograming, minimizing computer microprogram, computer microprogram theory, Moor automaton

ABSTRACT: As the microprogramming of computers has become very complicated, formalized methods of synthesizing and minimizing the microprograms have become necessary. The theory of abstract automatons is suggested for solving this problem. The author considers two types of microoperations (and, correspondingly, microinstructions):
(1) external microoperations that cause conversion of information in the arithmetical unit and
(2) internal microoperations that influence the control unit. A microprogram

ACCESSION NR: AP4015286

$M = A_1A_2...A_n$ is represented by the Moor automaton whose states are identical with the instructions of the microprogram. The final microcommand A_n represents the first microcommand of the next microprogram. The number of states of the A-automaton can then be minimized, which will result in minimizing the microprogram. An example of minimizing the program of division of two numbers is set forth in detail. The above method yields particularly important savings in minimizing complicated sets of microprograms. Orig. art. has: 7 tables.

ASSOCIATION: none

SUBMITTED: 13Nov63 DATE ACQ: 12Mar64 ENCL: 00

SUB CODE: CP NO REF SOV: 001 OTHER: 000

Card 2/2

L 10681-66 EWT(d)/EWP(1) IJP(c) BB/GG

ACC NR: AP6001195 SOURCE CODE: UR/0378/65/000/005/0001/0009

AUTHOR: Glushkov, V. M. (Academician; Director)

ORG: none

TITLE: Theory of automata and formal transformation of microprograms

SOURCE: Kibernetika, no. 5, 1965, 1-9

TOPIC TAGS: ~~automata theory~~ automaton, ~~microprogram transformation~~ mathematics, ~~formal microprogram~~ transformation, electronic computer design

ABSTRACT: The author stresses that in designing the principal blocks (block designing) of electronic computers, the computer is usually considered as an abstract automaton. However, successful application of the abstract theory of automata in designing of computers is difficult. In his previous article (Theory of automata and problems in designing the structure of digital computers. Kibernetika, no. 1, 1965), the author outlined a formal approach to block designing of computers and in the present article, he deals with further development of his previously presented ideas. Here he constructs a formal mathematical apparatus which makes it possible to apply sufficiently effectively the methods of abstract automata and other algebraic methods to block designing of computers. The starting idea, which is the basis on which the proposed theory is developed, consists in representing an electronic computer as the composition of two automata: operational and controlling automata

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L 10681-66
ACC NR: AP6001195

(terminology introduced by the author). Formulations of such automata are given and the concepts of a micro-operation (transformation of the set of states of an operational automaton into itself) and of a microprogram (a sequence of microinstructions, each of which coincides with a certain micro-operation) are introduced. It is explained how the problem of optimizing the structure of electronic computers is related to the transformation of microprograms. To develop a technique for transforming microprograms, a special algebraic apparatus and a special language for writing microprograms are presented on the basis of the concept of the system of microprogram algebras developed by the author in the article. It is shown how, by using certain relations in the corresponding pair of microprogram algebras, the necessary microprogram can be transformed into the more economical form which is usually used in performing the operation of multiplication. The concept of a regular microprogram is introduced. A theorem is proved establishing that every microprogram can be represented in a regular form and that an algorithm for such transformation exists. The problem of formal transformation of microprograms is analyzed and the procedure for such transformation is presented. An example illustrates this procedure. Orig. art. has: 2 figures and 31 formulas. [LK]

SUB CODE: 12,09/ SUBM DATE: 01Jul65/ ORIG REF: 004/ ATD PRESS: 4167

Card 2/2

L 04428-67 EWT(d)/EWP(l) IJP(c) BB/GG/BD

ACC NR: AT6014293 SOURCE CODE: UR/0000/65/000/000/0342/0345

AUTHOR: Glushkov, V. M. (SSSR); Letichevskiy, A. A. (SSSR); Stogniy, A. A. (SSSR)

ORG: none

48
B+1

TITLE: Algorithmic system for automating the synthesis of digital automata

SOURCE: International Symposium on the Theory of Relay Systems and Finite Automata. Moscow, 1962. Sintez releynykh struktur (Synthesis of relay structures); trudy simpoziuma. Moscow, Izd-vo Nauka, 1965, 342-345

TOPIC TAGS: discrete automaton, digital computer, algorithmic language

ABSTRACT: Programs are being developed (at the Institute of Cybernetics) for abstract, structural, and combinational synthesis of digital automata on a general-purpose digital computer. As input information, these forms are used: (1) A set of regular formulas (for abstract synthesis); (2) A flow and output table (for structural synthesis); (3) A system of dnf Boolean functions, i.e., the automaton

Card 1/2

L 08522-67 EWT(d) IJP(c)
ACC NR: AP6035581 SOURCE CODE: UR/0378/66/000/005/0001/0013

AUTHOR: Glushkov, V. M. (Academician AN UkrSSR) 37

ORG: none B

TITLE: On the problem of minimizing the microprogram and the schemes of algorithms

SOURCE: Kibernetika, no. 5, 1966, 1-3

TOPIC TAGS: cybernetics, finite automaton, ~~automata theory, microprogram~~ minimization, ~~Moore automation, Mealy automaton~~ algorithm

ABSTRACT: The author points out that in his previous article (Kibernetika, no. 5, 1965, 1-9) it is shown that the performance of an arbitrary microprogram can be reduced to a scheme of the interaction of two automata A and B. Automaton A is called operational and represents a finite or infinite Moore automaton, while B is called a control automaton and represents a finite Mealy automaton. Output signals (x_1, x_2,...x_m) of A are input signals for B, and output signals of B (microoperations y_1,...y_n) are input signals for A. It is assumed that the initial state b_0 of B is fixed, while the initial state of A can vary within certain bounds. The described coupling existing between the performance of A and B enables the author to conclude that not all a priori sequences of signals will appear at the input of B even when it is possible to select any initial state of A. In this fact, the author sees an additional possibility of minimizing the control automaton B and the microprogram which B represents. A method for realizing this possibility is developed which is

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ACC NR: AP6035581

based on the construction of finite automata which are called reduction automata. The procedure for constructing reduction automata and for substituting the partial automaton B_1 for B as well as an iterative procedure for determining the sequence of partial automata are presented. An example illustrates the procedure developed here for minimizing the microprograms. Orig. art. has: 1 formula.

SUB CODE: 09,06 SUBM DATE: 16Jun66/ ORIG REF: 003/ ATD PRESS: 5103

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GLUSHKOV, V.N., inzhener.

On setting up a tolerance and allowance system for the mechanical machining of forgings; our experience. Vest.mash. 27 no.12:66-71 D '47. (MLRA 9:4)
(Tolerance (Engineering))(Machine-shop practice)(Forging)

GLUSHKOV, V.

Oct 52

USSR/Metallurgy - Forging, Equipment

"A New Type Forge Shop," V. Glushkov, Stalin Price Laureate

Za Ekon Materialov, No 3, pp 69-72

Describes forge shop recently opened at one of Moscow plants, stating that there is no similar shop in whole world. All operatings are performed with the aid of electricity. Modern equipment, such as induction furnaces and forging presses, permit high degree of mechanization and automation. States that advanced forging practice will reduce metal consumption not only in forge shop but also in machining operations, raising total coeff of metal utilization in final product from 0.55 to 0.70.

Source #264T62

1. GLUSHKOV, V.N.

2. USSR (600)

4. Forging

7. New type of blacksmith shop in a machine building plant. Vest. mash. 32, no. 8, 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.