JPRS L/8937

21 February 1980

USSR Report

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

(FOUO 3/80)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200050039-2

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

For further information on report content call (703) 351-2938 (economic); 3468 (political, sociological, military); 2726 (life sciences); 2725 (physical sciences).

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200050039-2

JPRS L/8937

21 February 1980

USSR REPORT

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

(FOUO 3/80)

This serial publication contains articles, abstracts of articles and news items from USSR scientific and technical journals on the specific subjects reflected in the table of contents.

Photoduplications of foreign-language sources may be obtained from the Photoduplication Service, Library of Congress, Washington, D. C. 20540. Requests should provide adequate identification both as to the source and the individual article(s) desired.

CONTENTS PAGE

CONTENTS (Continued)

I. DEVELOPMENT AND PRODUCTION OF COMPUTERS AND CONTROL EQUIPMENT

A. General Treatment

INTERVIEWS WITH CHIEF COMPUTER DESIGNERS OF THE USSR AND GDR

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 11, 1979 pp 14-15

[Interviews with B. N. Naumov, general designer of the SM EVM, director of the Institute of Electronic Control Machines (Moscow) and corresponding member of the USSR Academy of Sciences, V. V. Przhiyalkovskiy, general designer of the YeS EVM, director of the Scientific Research Center of Electronic Computer Technology and Candidate in Technical Sciences, and G. Srok, general director of VEB Robotron Export-Import (GDR)].

[Text]

General designer of the YeS EVM V. V. Przhiyalkovskiy answers the questions of the correspondent.

[Question] What are the general idea and purposes of the exhibition?

[Answer] This year marks the 10th anniversary of the formation of the Intergovernmental Commission for Collaboration of the Socialist Countries in the Area of Computer Technology. The program for the creation of YeS EVM hardware and software of the second section ("Ryad-2") will be practically completed also this year.

The main purposes of the exhibition are reduced to the following:

1) to sum up the results of the 10-year collaboration on the YeS EVM and show what the combination of efforts of the socialist countries has given for the development of computer technology in the socialist camp;

2) to demonstrate to the specialists and management of interested enterprises, ministries and departments practically the entire gamut of machines, devices and operating systems of the YeS EVM and SM EVM, so that they may be oriented toward it in future work on the creation of various automated control systems;

3) to show specialists the progress in the creation of automated control systems of different scale.

[Question] How can the attained technical level of the YeS EVM be characterized?

[Answer] The "Ryad-2" program, which will be practically completed this year, will bring the general-purpose computer technology of the countries of socialist collaboration onto the level of the world industrial standards for most hardware and software items. With the start of production of the YeS-1065 computer next year the provision of a number of branches of industry and science with computer technology with high and superhigh productivity will be substantially improved.

[Question] What are the prospects of the development of the YeS EVM in the next few years?

[Answer] The transition of all YeS EVM machines to semiconductor immediate-access storage is now being completed. In 1980 the senior series model YeS-1060 computer will obtain a semiconductor storage with a volume of 8 Mbytes. Magnetic disk stores with capacities of 200, 317 and 625 Mbytes are being developed, and two-machine systems based on the YeS-1033, YeS-1035 and YeS-1060 computers have started to be produced. Next year the senior "Ryad-2" YeS-1054 computer will appear. Work is being completed on a program of further development of the YeS EVM series, the hardware and software of the next generation ("Ryad-3").

General designer of the SM EVM B. N. Naumov answers the correspondent's questions.

[Question] What place do SM EVM models occupy in the arsenal of computer hardware?

[Answer] The need to create a standardized series of small computer models that would meet completely the requirements of the rapidly developing economy of the CEMA member-countries became evident in the mid-1970's. In our country work on the SM EVM program was an organic development of experience accumulated by organizations of the Ministry of Instrument Making, Automation Equipment and Control Systems: computers of that class--the M-6000 and M-400 ASVT-M [modular systems of computer technology]--have found wide application in the solution of two important problems set for the branch in the years of the Tenth Five-Year Plan: automation of the control of technological processes and automation of planning and design work. The prospects of the principles of modularity in the designing of control computer complexes and systems based on them have been confirmed.

In the development of large-series production of computer hardware, small computers must be endowed with use properties that will contribute to the effective organization of new massive areas of use of electronic computers. Such qualities should include above all a substantial reduction of labor expenditures in the connection of computers with an object of control, small dimensions of the main and peripheral devices, which permit building the computer directly into the object of control, and also the appearance of new means of assuring reliability and longevity of control systems. When large universal computers are used in control systems the rigid centralized structure of the system is imposed on the user; under those conditions a certain redundancy of the equipment is inevitable. When small computers are used the equipment can be selected to obtain for each specific case the best correlation between costs of the object and the control system.

The development of the principles of problem orientation in systems based on small computers and distributed data processing results in very high requirements for the software. It is necessary to put at the disposal of the user a broad spectrum of programming languages; modularity of the main operating systems also acquires decisive importance. An effective mechanism of interaction must be created betwen the users of small computers and the developers of new software.

On the whole the transition to the production of problem-oriented computer complexes based on the SM EVM will create conditions in which a basis for the use of electronic computers in industry, science and the sphere of control, a basis common to the entire national economy, will form.

[Question] Which areas of application of the SM EVM are most effective?

[Answer] SM EVM hardware and software being developed for the construction of systems for the control of technological processes and production facilities, the automation of scientific experiments and the gathering and processing of data in multilevel complexes. Important practical results have been achieved also in the creation and introduction into practice of design

planning of complexes of the type of the "automated working place of the designer."

One of the basic tasks of the SM EVM program, as has already been mentioned, is the development of so-called problem-oriented complexes for newly organized areas of application of computers. Examples of the mentioned complexes are measuring and computing complexes (IVK) in which SM-3 and SM-4 computers are connected with program-controlled instruments of CAMAC or ACET [expansion not given] systems; the measuring and computing complexes are widely used in such areas of science as nuclear physics, the physics of the earth, oceanology and biology. Problem-oriented complexes are also being created to solve problems in the control of monitoring and testing equipment, the preparation of programs for machine tools with numerical control and the processing of economic data. Expansion of the list of those complexes is connected with the appearance of new types of peripherals (thus, the effectiveness of solution of tasks in the processing of textual information is greatly increased with the transition to the use of flexible magnetic disks instead of punched cards and the organization of new software oriented toward dialog regimes). The development of multimachine networks on the basis of YeS EVM and SM EVM models will permit creating systems with distributed data bases and various remote processing regimes; as a result the effectiveness of the use of large universal computers will be increased.

[Question] What are the prospects of the development of SM EVM in the next few years?

[Answer] In proportion to the organization of new areas of application of small computers and the appearance of a new unit base (in particular, microprocessor sets of large-scale integrated microcircuits), requirements have begun to form for models of the second line of SM EVM, the production of which will be expanded at the start of the 1980's. In determining the characteristics of that generation of small computers, three basic varieties of the basic equipment were distinguished: micro-computers for mass applications in lower control systems, small computers with expansion of the range of working characteristics (storage volume, speed and the use of external devices on the basis of new physical principles) and specialized processors, during the connection of which to micro- and small computers the productivity of a given problem-oriented complexfrom the selected class of problems will substantially increase. With expansion of the spectrum of SM EVM models and reduction of their cost, broader possibilities will appear for the introduction of computer hardware in those regions of the national economy in which automation is capable of assuring the greatest economic effect: machine tools and robots with programmed control, means of transport, medical equipment, scientific and measuring instruments, means of office mechanization. Simultaneously plans are being made for the very rapid creation and organization of software convenient to operate, which will permit expanding work on the production of various control complexes already by the start of production of series SV EVM models of the second line.

G. Srok gives an interview.

[Question] Can you tell us about Robotron and its goals and tasks in the national economy of the GDR?

[Answer] The Robotron combine was formed in 1969 on the basis of combination of several production enterprises and institutes. Its main tasks are the development, production and delivery to users of devices for electronic data processing as an important means for the rationalization of processes of production and control and the effective solution of scientific and technical problems.

The combine now consists of 21 enterprises. At 14 production enterprises, at the Center for Science and Technology, at enterprises for the production of means of rationalization of processes, four sales enterprises and the national foreign trading enterprise of the GDR, Robotron Export-Import, 70,000 workers, engineers, scientific workers and economists are working. Over 7500 workers are studying questions of research and development.

The export program of Robotron includes electronic installations for data processing, small computers, control and mini-computers, equipment for data input, output and processing, automatic accounting and billing machines, typewriters, means of office mechanization and drawing machines, measuring electronic devices, radio relay technology and household electronics.

[Question] What trade contacts does Robotron maintain with the USSR and what percentage of the total exports of the combine do deliveries to the USSR represent?

[Answer] Over 60 percent of our exports go to the USSR. The USSR is an important foreign trade partner of the combine. The development of exports and imports with the USSR, as with other socialist countries, is based on long-term agreements and contracts on specialization and collaboration.

The export of YeS EVM computers, peripherals and mini-computers to the USSR and other socialist countries is supplemented by large deliveries of automatic accounting machines and calculators, and also typewriters and printing presses.

[Question] What contacts in the area of imports exist between the Robotron combine and Soviet exporters?

[Answer] Imports of machinery and equipment from the USSR into the GDR have developed at rapid rates. The volume of deliveries from the USSR to the GDR are 6 times greater than in 1970. The GDR has obtained the YeS-1020/22 computer from the USSR. In addition, we buy desk calculators, cash registers and peripherals for electronic computers in the USSR. Soviet YeS-1035 computers will be introduced in various important national economic sectors of the GDR in 1980.

[Question] Can you tell me the most important export deliveries to the USSR, for which sectors of the national economy they are made, the main users they are intended for and what those articles are?

[Answer] In 1978 the combine shipped over 100 YeS-1040 computer configurations to the USSR. Within the framework of the Five-Year Plan effective at the present time our articles, in particular the YeS-1040 computer, automatic accounting and billing machines are being successfully used at the large construction sites of Orenburzh'ye, the Kamskiy Motor Vehicle Plant, at enterprises for the use of atomic energy for peaceful purposes, in aircraft building, transportation, the energy economy and many scientific institutes of the USSR. By means of information gathering devices, accounting and billing machines and computers designed for specific operating conditions many problems are being solved in industry, science and the economy. The hardware corresponds to the present-day level, is constructed on the basis of microprocessor units and meet the requirements of the world market.

[Question] How is the Robotron combine participating in international exhibitions in the USSR, and are specialized exhibitions held in the GDR?

[Answer] In the course of our many years of joint work we have participated in many exhibitions and fairs in the USSR and have organized many specialized exhibitions ourselves. In 1978, on the threshold of the 61st anniversary of the Great October Socialist Revolution, we conducted the 13th specialized exhibition of office machines of the combine in Alma-Ata, and a subsequent exhibition is planned for October 1980 in Kiev. In addition, we are participating in international exhibitions and fairs being conducted in all countries of the world.

All this helps to acquaint users of the USSR with the export program of the Robotron combine and is a demonstration of the close collaboration of the USSR and the GDR.

The combine exports its production to 66 countries, and in more than 25 of them it has its own representatives.

[Question] What work is the Robotron combine doing within the framework of the Unified System of Electronic Computers of the socialist countries?

[Answer] By its work in the Unified System of Electronic Computers (YeS EVM) and the International System of Small Computers (SM EVM) the combine is making a large contribution to socialist economic integration. This collaboration is characterized by the fact that the combine assumes the responsibility for the performance of agreed-upon tasks in the development, production and use of electronic computer technology.

Over 80 percent of the themes in the stages of research and development are connected with joint work of the GDR and the USSR.

The high scientific and technical achievements of workers of the Robotron combine are clearly traced on the example of new systems of YeS-1055 computer articles and peripherals at the exhibition.

[133-2174]

2174
CSO: 1863

B. Hardware

'ISOTIMPEX' DISK PACKAGES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 10, 1979 p 47

[Advertisement]

[Text]

	Type of Package			
	YeS 5053	YeS 5261	YeS 5269	IZOT 5266
Capacity in Mbytes	7.25	29/58	2.45/5	100
Number of disks	6	11	1	12
Number of recording surfaces	10	20	2	20
Track density (TPI)	100	100/200	100/200	200
Recording density (BPI)	1100	2200	2200	4400
Compatibility of disk package, with	IBM 1311 or equivalent	IBM 2314 or equivalent	IBM 5440 or equivalent	IBM 3300
Specification number	2864	3564	3562	4337

Contemporary technology meets the requirements of the customer. The above will help you select us as a supplier.

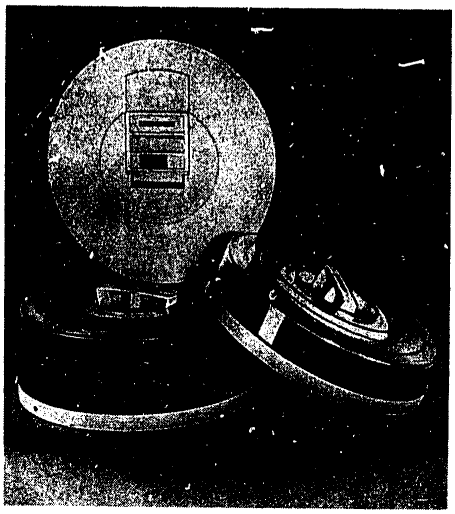
ISOTIMPEX
VTO "ISOTIMPEKS" Bulgaria
Sofiya
ul. Chapaeva, 51

Telephone: 73-61
Telex: 022731

ORGANIZATIONS AND ENTERPRISES ACQUIRE COMMODITIES IN THE ESTABLISHED PROCEDURE THROUGH THE APPROPRIATE MINISTRY AND DEPARTMENT.

REQUESTS FOR A PROSPECTUS OR CATALOG SHOULD BE DIRECTED TO: 103074,MOSCOW, PL. NOGINA, 2/5, INDUSTRIAL CATALOG SECTION, USSR STATE PUBLIC SCIENTIFIC AND TECHNICAL LIBRARY.

V/O "VNESHTORGREKLAMA"
[All-Union Foreign Trade Advertising Association]



[130-2174]

2174
CSO: 1863

UDC 531.7.081:681.327.66

MEASUREMENT OF GEOMETRIC PARAMETERS OF MAGNETIC DISKS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 10, 1979, pp 25-26

[Article by Engineers V. I. Popov, A. A. Zemlitskas and L. L. Musteykis]

[Text] Magnetic disk stores YeS-5050, R-412, R-421, etc, are widely used at the present time as external computer storages. The geometric parameters of the data carrier, the magnetic disk, have a considerable influence on the quality and working reliability of those stores. Of very great importance are the parameters that characterize the quality of manufacture of the working end faces of magnetic disks (end runout, acceleration of end runout, etc).

The rigid technical conditions presented for magnetic disk parameters in the micrometric range stipulate specific requirements for control methods, and the precision of measuring devices and their precision mechanical parts [1, 2]. It should be noted that magnetic disk parameters are monitored 3 or 4 times in various stages of the technological process of the manufacture of disks and their bases. Therefore besides meeting the indicated requirements such devices must measure all the principal magnetic disk parameters, have an improved output of information about the results of measurements and be automated, productive, and convenient and simple to operate.

On the basis of that, to reduce labor intensiveness and improve the quality of output, a unit for monitoring the geometric parameters of magnetic disks [ustanovka dlya kontrolya geometricheskikh parametrov MD (UKMD)] has been developed in the Special Design and Technological Office of Means of Automation of the Vil'nyus "Sigma" Computer Equipment Production Association [3].

Figure 1 presents a photograph of the unit. It is executed in the form oa a table, on the horizontal surface of which are a plate with a rotary drive and a magnetic disk holder, a carrier with measurement sensors that move in a straight line over the radius of the magnetic disk, a control panel and a display panel. The main electronic part of the unit is made of series K140 and K155 microcircuits, set on standard replaceable elements.

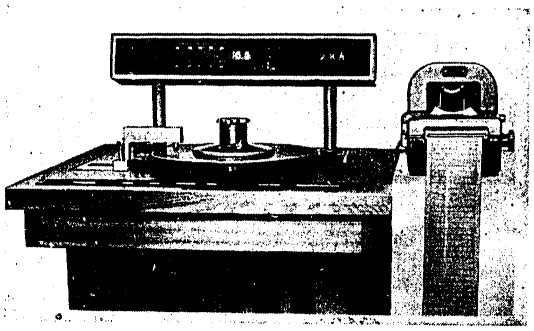


Figure 1. External appearance of the UKMD (table)

Main technical characteristics of the UKMD

Main dimensions of disks, in mm:	
inner diameter	350
outer diameter	150
thickness	2.4-0.1
Range of measurements:	
runouts and deviations, in μm	±100
accelerations, in m/s^2	±100
Measurement error:	
runouts and deviations, in μm	±3
accelerations, in m/s^2	±4
Capacity (magnetic disks/hour)	20
Nonalignment of motion of the carrier in relation to the basic plane of the magnetic disk, in μm	≤2
End runout of spindle on basic plane, in μm	≤2
Rate of spindle rotation, rpm:	
static	≤10
dynamic	1500±15
Power from three-phase AC network, in V	220^{+10}_{-15}%
	50±1 Hz
Power consumption, in W	≤600
Dimensions, in mm	700 x 1070 x 680

The unit under consideration measures the following parameters: the end runout, the deviation of the surface of the magnetic disk from the basic plane, the acceleration of the surface of the magnetic disk in axial direction; it registers the results in digital form on the "accept"-"reject"

principle by a self-register, has a method of magnetic disk fastening by hand and also by means of a fixed-stress spring, works manually and automatically and monitors magnetic disks according to rigid and variable programs.

Figure 2 presents a block diagram of the unit.

The action of the UKMD is based on the change of electric capacitance between the sensor electrode and the magnetic disk end face, as a result of change of the distance between them during rotation of the magnetic disk. A high-sensitivity contactless capacitance transducer is used in the UKMD. An important advantage of it over the inductive transducer recommended in [1] and transducers of other types is the possibility of measuring the parameters of objects of control regardless of their physical structure and type of material, that is, capacitance transducers are suitable for the inspection of magnetic disks in various stages of their manufacture (the backings, the magnetic disk bases, etc), which permits using equipment of one kind (or one and the same unit) to monitor the parameters of magnetic disks after any technological operation of their manufacture.

The measurement circuit is constructed on the basis of the phase-pulse method with the use of two synchronized generators, a measurement generator (1) and a reference generator (2). A capacitance transducer (3) is connected to the circuit of the high-frequency measurement generator (1) and creates in the circuit a phase shift of sinusoid measurement voltage (4) in relation to the reference voltage (5). The voltages (4) and (5) in the amplifier-limiters (6) are transformed into pulses with a steep front and proceed to the phase detector (7) and further to the controlled amplifier (8). The value and polarity of change of the direct voltage on the output of the detector (7) are determined by the phase ratios of the signals of the measurement and reference tracts. The output voltage of the amplifier (8) is an electric analog signal proportional to the mechanical value being measured, movement of the magnetic disk in axial direction. That signal is led out through the commutator (9) to socket X3, to which the self-register or another registering instrument can be connected. During measurement of acceleration the signal is differenitated twice by the differentiating amplifier (10). An analogous signal of acceleration can be observed on the screen of the oscillograph connected to socket X2.

After analog-digital conversion all further processing of data is done in digital form, after which the parameters in the dimensionalities of the values being measured (in μm and m/s^2) are brought out on the display panel (11). Thence from the rejection discriminator (12) comes discrete information in the "accept"-"reject" form, and also auxiliary information about the working conditions and calibration of the unit.

The precision of measurement of movement by the capacitance transducer is determined by the stability of its electrical and design characteristics. Additional errors of measurement arise as a result of variation of those characteristics during change of external conditions, in particular, of

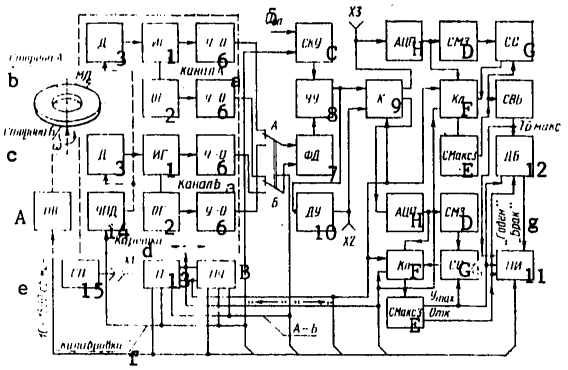


Figure 2. Block diagram of the UKMD

A -- rotary drive;
B -- control panel;
C -- amplification calibration circuit;
D -- instantaneous value counter;
E -- maximum value counter;
F -- valve;
G -- comparison circuit;
H -- analog-digital converter;

a -- channel
b -- side A
c -- side B
d -- Carriage
e -- 10-1500 rpm
f -- calibration
g -- "accept"-"reject"

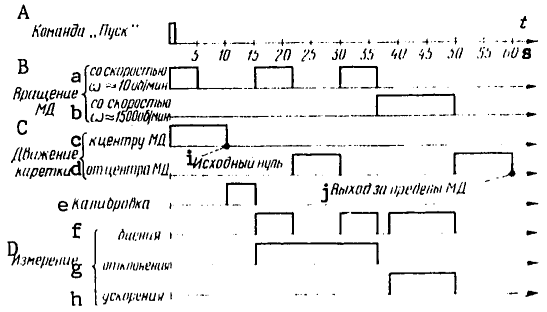


Figure 3. Cyclogram of work of the UKMD according to a standard program.

A -- START
B -- Magnetic disk rotation
C -- Carriage motion
D -- Measurement
a -- at 10 rpm
b -- at 1500 rpm
c -- toward center of magnetic disk
d -- from center of magnetic disk
e -- calibration
f -- of runout
g -- of deviation
h -- of acceleration
i -- initial zero
j -- emergence beyond limits of magnetic disk

temperature, humidity and dielectric constant of the air and the drift of the transformer characteristics. These factors have a substantial influence on the results during prolonged measurements without intermediate correction of the transducer characteristics. To eliminate the influence of the above-mentioned destabilizing factors the following method of improving the precision of measurement has been used in the UKMD: before the magnetic disk parameters are measured the conversion factor of the entire transducer-indicator measurement loop is calibrated in the unit in the following manner: at the order of the programmer (13) the transducer by means of the transducer movement device (14) completes the mechanical calibrated movement Δx. The amplification calibration circuit changes the transmission coefficient of the controlled amplifier until the analog signal on its outlet is equal to the given reference voltage (5), which is strictly proportional to the displacement Δx.

The transducer returns to the initial position and the conversion factor of the measurement loop proves to be precisely calibrated.

The unit works automatically according to the given interchangeable program (15). Figure 3 explains measurement of magnetic disk parameters automatically according to a standard program. The unit has been introduced and has been in operation for 1.5 years at the Panevezhskiy Precise Mechanics Plant, which produces magnetic disks. On the basis of the described principles and the presented block diagram it is possible to construct precise apparatus for contactless measurement of small displacements, gaps and vibrations in instrument making and precision machinery building.

BIBLIOGRAPHY

1. Kuteynikov, V. Ye. "Principal technological requirements for providing the macro- and microgeometry of the base of a magnetic disk." VOPROSY RADIOELEKTRONIKI. SER. "TEKHNOLOGIYA PROIZVODSTVA I OBORUDOVANIYE," 1974, No 4.

2. Falovskiy, V. F., et al. ""Existing means of controlling the macrogeometry of disks and their analysis." Ibid., 1975, No 3.

3. "Unit for monitoring the geometric parameters of magnetic disks (UKMD)." Informatsionnyy listok No 13-76. Ser 13-05/Central Scientific Research of Information and Technical-Economic Investigations of Instrument-Making of Means of Automation and Control Systems.

[130-2174]

2174
CSO: 1863

UDC 621.377.623.222

DIGITAL MAGNETIC TAPE RECORDER FOR AUTOMATED CONTROL SYSTEMS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 10, 1979 pp 30-31

[Article by Engineers Yu. A. Sorokin, V.V. Stepanov and Yu. V. Shatalov]

[Text] The TsM4-2 digital magnetic tape recorder examined in the present article records and reproduces pulsed signals in the binary system with the application of horizontal or longitudinal recording without return to zero and with unit modification.

The magnetic tape recorder consists of a tape drive, a tape-drive control unit, a recording and playback unit, a power unit and a control panel. The tape drive includes the following functional components: a low-inertia drive motor with a driveshaft, cassette units with motors, clamp and guide rollers, supports, a shock absorber and controls (knobs and tape start and stop devices). The tape-drive control unit includes a drive-motor control unit consisting of a tachogenerator--a tape velocity sensor with an amplifier; a servosystem for following the stepwise and continuous tape motion and two driveshaft power amplifiers. The cassette motors are controlled from a transformer lying below through a commutation relay. The recording and playback unit contains a set of seven magnetic heads, amplifiers and formers of recording and playback gating pulses and output information signals.

The power unit has six power sources (+6, +8, +12, +18, -8 and -12 V) which are needed to power the magnetic tape recorder circuits and motors. Provision is made in the control panel for push buttons with illumination and a fixed position. The digital magnetic tape recorder is connected with a computer through a connector which matches their logical levels and transform 12-digit machine words into two 6-digit magnetic tape recorder words, and the reverse.

The digital magnetic tape recorder works in the following modes: loading (advancement of the tape to the marker reading "Start tape"; recording and playback step conditions and continuous conditions; rewind.

The information is recorded on seven tracks in parallel, in zones of arbitrary length. Bits arranged in a single step of the recording on seven tracks constitute a line. The step tape drive moves the tape one step at once after the

information has been recorded. As a result of equality of the step distances, information is recorded with a constant density and the length of the time interval between two successive arrivals of information can vary in a very wide range. The constant distance between recorded information lines permits both continuous and stepwise playback. The intervals between recordings may be recorded upon command. Such intervals are revealed during playback. The maximum zone length is limited by the volume of the computer's immediate-access memory, and the minimum zone must be not less than two lines.

Within the limits of the recording zone the correctness of recorded information is monitored by longitudinal evenness along the track and transverse evenness along the line. Errors are revealed by the computer during playback.

In the magnetic tape recorder the seventh track is used to monitor transverse evenness; longitudinal evenness is monitored at the end of the data file.

Technical characteristics of the digital magnetic tape recorder

Number of tracks	7
Recording density in lines per mm, at least	4
Mean data retrieval time, minutes, not more than	30
Recording and playback rate in lines per second during work under the following conditions:	
step	0-150
continuous	Up to 500
Variation of magnetic tape velocity under continuous conditions, percent, not more than	± 2.5
Tape rewinding rate, in mm/second, not less than	350
Control and data signals (logical levels), in V	
"1"	5.5 ± 0.5
"0"	0 ± 0.5
Power voltage, in V	220^{+22}_{-33} (50 Hz)
Power consumption, in W, not more than	180
Dimensions, in mm	525 x 735 x 415
Mass, in kg	80

[130-2174]

2174
CSO: 1863

PHOTOGRAPHS OF 'YES' AND 'SM' COMPUTERS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 10, 1979 front cover and inside front cover

[Pictures and description]

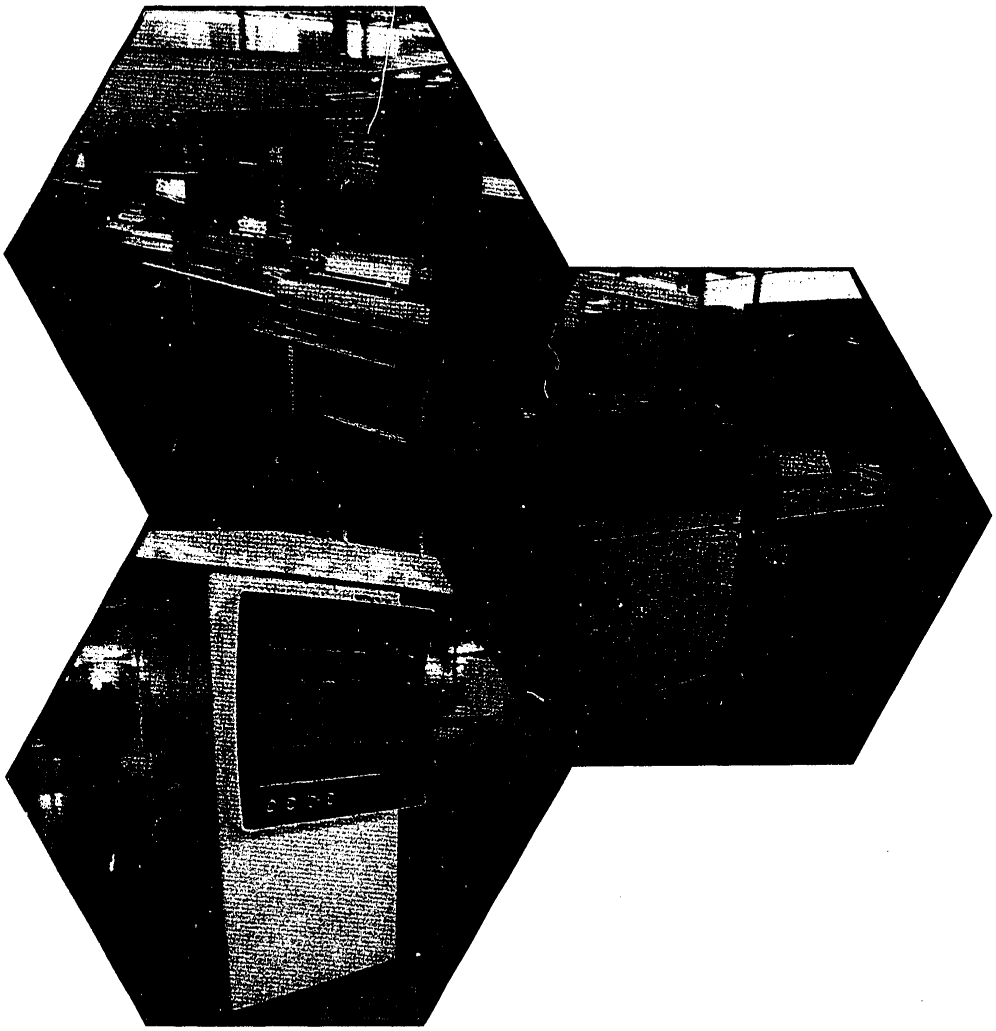
[Text] On the front cover: exhibits of the international exhibition, "YeS EVM and SM EVM Equipment and Applications," being held at the USSR Exhibition of Achievements of the National Economy.

1. Two-machine unit based on the YeS-1060 (USSR). The YeS EVM has a capacity of 1,200,000 operations per second and an immediate-access memory of 8000K bytes.

2. The YeS-1055 computer (GDR). A capacity of 350,000-500,000 operations per second and an immediate-access memory of 256K-2048K bytes.

3. The YeS-2335 matrix processor in the YeS-1035 computer unit (Bulgaria). The YeS-1035 has a capacity of 100,000-140,000 operations per second and an immediate-access memory of 256K-512K bytes.

[Pictures on next page]



[130-2174]

UDC 681.628.3:62-19

IMPROVING THE WORKING RELIABILITY OF THE PA80-2/3M KEYPUNCH

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 11, 1979 p 33

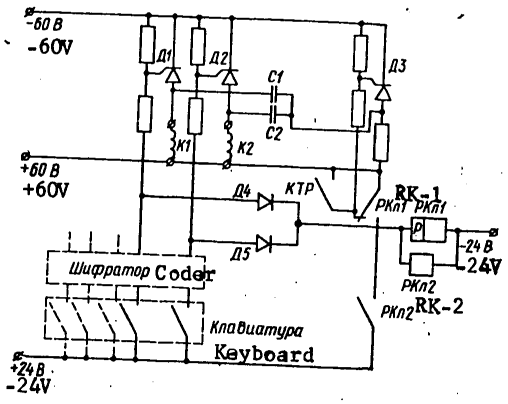
[Article by G. A. Konovalov, engineer]

[Text] The PA80-2/3M keypunch for preparing data on punch cards has a number of deficiencies that reduce the utilization factor and make servicing difficult. In particular the voltage for the control electrodes of the power thyristors is applied by polarized relays with inherent scattering of operating time, resulting in vibration of the one-shot mechanism and requiring frequent regulation.

Besides, the blocking thyristors and variable resistors that control the firing threshold frequently fail in the power thyristor turnoff circuit. These deficiencies can be eliminated, and the number of circuit components can be reduced at the same time if the blocking thyristors use a power supply connected to the main supply (+60 V).

The two supplies are connected only by the positive wire through a contact of a key-driven relay. When this is done, 13 key-driven relays can be replaced by two (RK-1 and RK-2 in the diagram) connected in parallel. The supply to these relays is organized via keyboard contacts and isolating diodes Д4, Д5 (one for each position). The new key-driven relays eliminate 13 blocking thyristors and replace them with two (one for each half of the punch card). Now depression of a key sets up two electric circuits: a key-driven relay supply circuit, and a circuit for activating the punching thyristors. The key-driven relay supply circuit contains an additional +24 V source, a key contact, isolating diode Д5, the windings of key-driven relays RK-1 and RK-2 and another -24 V supply.

The punching thyristor circuit is actuated only when the contact of key-driven relay RK-1 operates. When this happens, the positive side of the main supply (+60 V) is connected through a contact of key-driven relay RK-1 and a keyboard contact to the control electrodes that correspond to the code of thyristors Д1, Д2. Before closing the circuit of the control electrodes of the punching thyristors, the contact of the key-driven relay removes the positive voltage from the electrode of blocking



thyristor Д3 and prepares it for closure. The blocking thyristor is closed by a reverse polarity pulse passing through open punching thyristor Д2. Operation of solenoid K2 closes a contact of transfer frame KTP, and in this way the positive voltage is again supplied to the controlling electrode of the blocking thyristor. This thyristor then opens, and a pulse from capacitor C2 that has had time to recharge closes the punching thyristor. The circuit is reset to the initial state.

Elimination of blocking thyristors has obviated the need for variable resistors to control the firing threshold of these thyristors.

Thus there is a savings in servicing time for the keypunch as well as a savings of components. A keypunch with this circuit can operate for a long time and does not require adjustment in the electrical part. All modes of operation remain unchanged.

The deficiencies mentioned in this article have been eliminated in the PA80-2/3M keypunch that is currently being produced. Therefore the article is addressed to those who are now using the PA80-2/3M in the old modification.
[133-6610]

6610
CSO: 1863

FRONTCOVER PICTURES FROM 'PRIBORY I SISTEMY UPRAVLENIYA'

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 11, 1979 frontcover, inside frontcover

[Pictures and caption]

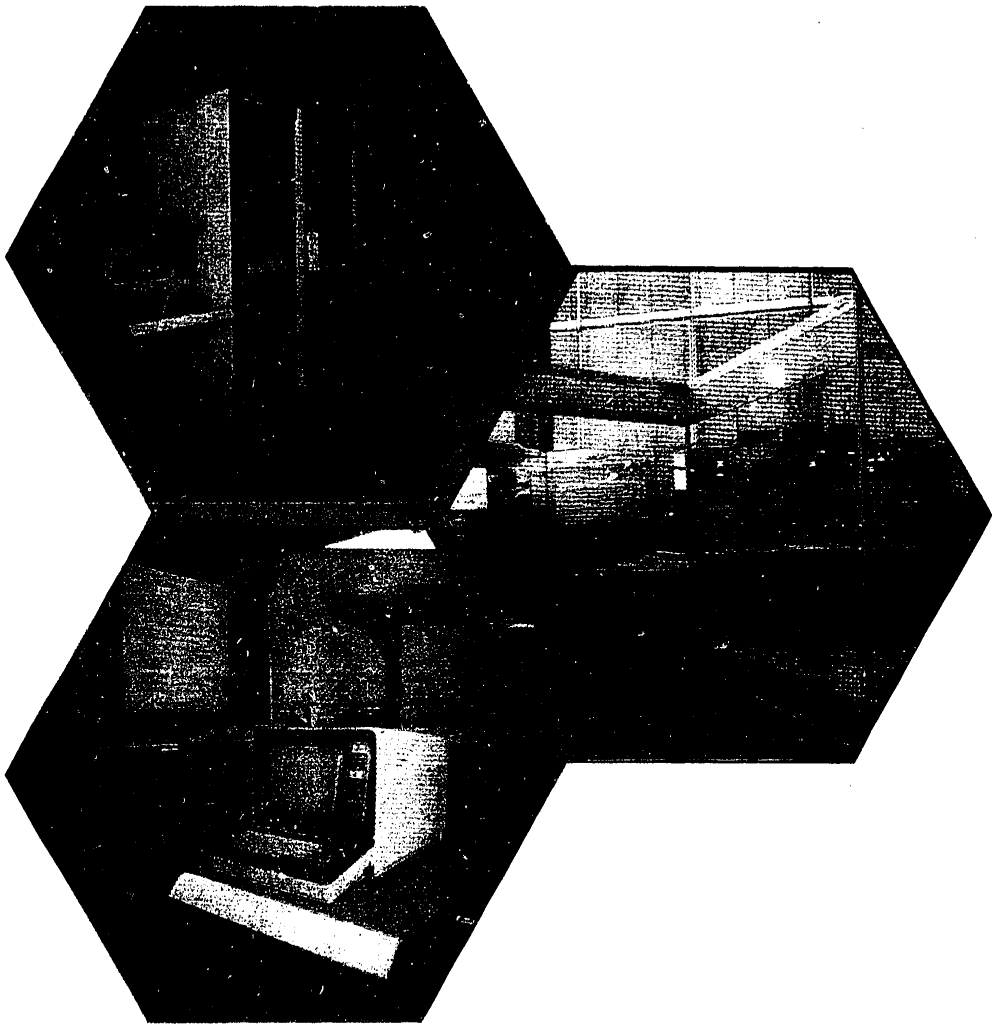
[Text] On the frontcover are pictures of exhibits of the international exhibition "YeS EVM and SM EVM Equipment and Its Application," at the Exhibition of Achievements of the National Economy of the USSR.

1. The IVK-8 measuring and computing complex, based on the SM-3 (SM-4) computer, intended for the automation of metrological investigations and tests of instruments and measuring equipment.

2. Dispatcher control desk and panel in the automated system for the control of technological processes and production of the first 1200 MW unit of the Kostromskaya GRES, based on an SM-2 process control computer complex.

3. The SM-1800 minicomputer.

(Pictures on next page)



[133-2174]

2174
CSO: 1863

EXHIBITION OF YeS EVM AND SM EVM COMPUTERS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 11, 1979 pp 9-13

[Article]

[Excerpts] From 15 June to 15 July 1979 in Moscow at the Exhibition of Achievements of the National Economy of the USSR an international specialized exhibition "YeS EVM and SM EVM Equipment and Its Application" [YeS EVM --Unified System of Electronic Computers; SM EVM--International System of Small Computers] was held, dedicated to the 30th anniversary of the formation of the CEMA and the 10th anniversary of the organization of collaboration of the socialist countries in the area of computer technology.

In order to create and use contemporary computers in the national economy on the basis of development of economic integration and the principles of the socialist division of labor the governments of Bulgaria, Hungary, GDR, Poland, the USSR and the CSSR in December 1969 concluded a multilateral agreement on collaboration in the areas of the development, production and application of computer equipment. In 1972 the Republic of Cuba was added to it, and in 1973 the Socialist Republic of Romania.

The need to combine efforts and industrial resources in the development of computer equipment resulted from the fact that before 1970 the socialist countries independently of one another produced over 30 types of different, mutually incompatible electronic computers with special sets of peripherals for each machine and different, incompatible software.

In the first years of collaboration of the socialist countries the general direction of the work was determined, a unified technical policy was worked out and the main tasks on the creation of the YeS EVM were formulated.

Produced in series at the present time are the YeS-1010 (Hungary), YeS-1021 (CSSR), YeS-1040 (GDR) and YeS-1050 (USSR), that is, all the computers belonging to the "Ryad-1" family, the modernized "Ryad-1" computers YeS-1011 (Hungary), YeS-1012 (Hungary), YeS-1022, USSR, Bulgaria), YeS-1032 (Polish), YeS-1033 (USSR), and the "Ryad-2" computers YeS-1025 (CSSR), YeS-1035 (USSR, Bulgaria), YeS-1055 (GDR) and YeS-1060 (USSR). A total of 193 YeS EVM articles have undergone joint international tests.

Work on the creation of the SM EVM was started in 1974. Now 78 SM EVM devices, including four types of SM EVM processors, have now undergone joint international tests and been introduced into series production. There is a plan for the development of SM EVM (second section).

One hundred and forty-eight packages of applied programs (140 for YeS EVM and 8 for SM EVM) have also been developed in collaboration and have undergone joint international tests.

Many varied technical devices have been created for the remote processing of YeS EVM and SM EVM data (modems, multiplexers, terminals, etc), unified by a common system architecture, single interfaces and exchange procedures.

In proportion to the development, production and introduction of contemporary computer equipment the system of their complex servicing, consisting of national organizations for complex servicing of the countries participating in the agreement, has been organized and improved. To assure effective use of computer equipment, in all the countries personnel are being prepared in special educational centers equipped with modern instructional aids and the necessary computers.

The total sales of computer equipment between countries participating in the agreement in 1978 were 16 times as large as in 1971.

The main directions in specialization and cooperation in the development and production of computer equipment for 1981-1990 were determined by an intergovernmental commission for computer equipment.

The development and production of computer equipment are being carried out in countries participating in the agreement on the basis of unified standards of the intergovernmental commission and in accordance with them.

The international exhibition "YeS EVM and SM EVM Equipment and Its Application" demonstrated the results achieved in the creation of computer equipment, and especially in their use in the national economies of the socialist countries.

It was not the first exhibition of computer equipment in our country. In 1973 there was an exhibition devoted to the first YeS EVM family, which showed the unity of the technical policy of the socialist countries in the development and production of computer technology.

The 1974 exhibition, "Automated Systems for the Control of Technological Processes" (ASU TP 74), played a large role in disseminating the advanced experience of Soviet industry.

An important feature of the 1979 exhibition is the demonstration of the effective application of computer systems in the management of the economy and of industry, in science and many sectors of the national economy.

The importance and influence of computer technology on the development of all sectors of the economy, the rates of scientific and technological progress

and the solution of many social questions are well-known. There is no sphere of human activity the effectiveness of which would not depend on the rational application of modern computer equipment, automated systems for the processing and storage of information, and control systems.

Displayed at the exhibition were over 130 automated systems in operation in various sectors and at various objects, but constructed on the basis of the same standardized YeS EVM and SM EVM hardware and software.

The assurance of organizational, methodical and technological unity of automated control systems is successfully solved in the countries of socialism thanks to unity of technical policy. The exhibition convincingly confirmed this: the systems created in one country work in equipment produced in other countries; the hardware and software developed by different ministries supplement one another and expand the possibilities of the entire complex of equipment; the total pool of programs of multi-purpose and multiple use is continuously growing and becoming an achievement of all users of computers, etc.

The exhibition demonstrated that the YeS EVM and SM EVM have all the necessary hardware and software for the creation of automated control systems with the prescribed complexity and for practically any sphere of application.

At the 1979 exhibition a display was opened for the first time that discussed the functions and possibilities of service enterprises of the socialist countries, which have been combined into an international system of centralized and complex technical servicing that in proportion to development is taking on itself increasing volumes of work.

The technical section of the exhibition consisted of a computer center with many computers, with equipment for data preparation, input-output, display and storage.

The total capacity of YeS EVM "Ryad-2" machines exhibited in the technical section is about 4 million operations per second. The total magnetic disk storage capacity is 2800 Mbytes. Three remote processing systems--based on connecting processors YeS-8371 (Bulgaria) and YeS-8731.01 (Poland) in YeS-8410 and YeS-8421 multiplexers (Hungary)--together with local terminals serviced six system sections placed around the technical section, in which specific for the automation of organizational management, the control of production and the management of planning and science.

Four new operating systems (the OS 6.1, OS 4.1, DOS 3 and DOS 2.2) controlled computational processes on YeS machines.

The YeS 1060 (USSR), 1055 (GDR), 1035 (USSR, Bulgaria), 1025 (CSSR) and 1015 (Hungarian) computers, two types of magnetic disk stores YeS-5067 and YeS-5066-01 (Bulgaria), three magnetic tape stores YeS-5612, YeS-5003 and YeS-5012 (Bulgaria), two telecommunication processors YeS-8371.01 (Poland) and

YeS-8371 (Bulgaria), the YeS-2335 matrix processor and data input-output devices and terminals of over 20 types were shown at the exhibition for the first time.

The central part of the technical section display was the VK-2R-60 unit, consisting of two YeS-1060 computers, with a processor capacity of over 1 million operations per second and an immediate-access storage with a capacity of 4 Mbytes. Provision is made in the system for the virtual addressing of an immediate-access storage with a capacity of 16 Mbytes. Under the conditions of the exhibition a YeS-8371.01 telecommunications processor (Poland) and a YeS-8410 data transmission multiplexer (Hungary) were connected to the VK-2R-60 unit, servicing 64 and 16 communications channels respectively. Connected through the teleprocessor, multiplexer and directly to the VK-2R-60 unit were 30 external devices and terminals, installed at the exhibition, by means of which the accomplishment of 53 different tasks of automated control systems was displayed.

The YeS-1055 module (GDR) is a medium-class computer. It has a speed of 450,000 operations per second and an immediate-access storage capacity of 1 Mbyte (a semiconductor memory). The machine contains one multiplex and three block selector channels, the carrying capacity of which is 1.5 or 3 Mbytes/s per channel. At the exhibition the YeS-1055 serviced an AIDOS information reference system. Demonstrated in a unit with the machine, besides standard peripherals, was the work of the machine with a YeS-7054 curve plotting board and a YeS-7602 device for data output on microfiches.

The YeS-1025 (CSSR) is a small YeS computer. Its has a speed of about 60,000 operations per second, an immediate-access storage capacity of 256K bytes and an external storage volume (Soviet YeS-5066 stores) of 100 Mbytes.

The YeS-1025 computer (like the YeS-1015--Hungary) works with a DOS 3 operating system, created jointly by specialists of the USSR, CSSR and Hungary. The DOS 3 system organizes multiprogram working conditions and remote access to data and has visual addressing of an immediate-access storage with a volume of 16 Mbytes, which substantially increases the effectiveness of use of YeS EVM "Ryad-2" small computers as compared with similar "Ryad-1" computers.

The YeS-1025 machine was equipped with punched-card devices of the CSSR Aritma plant and input-output devices constructed on the basis of YeS-5074 on flexible magnetic disks.

The YeS-1035 computer (USSR and Bulgaria) is a medium-class machine. It was displayed at the exhibition with the YeS-2335 matrix processor (Bulgaria), which on tasks that are reduced to matrix multiplication and conversion, develops a speed of up to 10 million operations per second (increases the productivity of the YeS-1035 computer by 34 times). The YeS-2335 processor is the first matrix processor in the YeS EVM. At the exhibition the YeS-1035 was equipped with the YeS-5066.01 (100 Mbytes) and YeS-5067 (200 Mbytes) magnetic disk stores, developed in Bulgaria.

The YeS-1045 (USSR) is a medium-class machine. Its processor has a mean speed of about 700,000 operations per second and the immediate-access storage volume is about 4 Mbytes. The machine is compact and equipped with one multiplex and five block multiplex channels. Operating efficiency is guaranteed by high technical parameters and developed microdiagnosis. The machine includes all the necessary means of integration. At the exhibition 50 terminals were connected to the YeS-1045 through a YeS-8371.01 to demonstrate 20 systems and tasks.

All the first models of the SM EVM process control computer complex (SM-1 - SM-4) were represented in the technical section, as well as a broad list of SM EVM peripherals: magnetic disk and magnetic tape (reel and cassette) external storage devices; alphanumeric and graphic displays; equipment for successive and parallel printing, communication with an industrial object, long-range communication for the connection of remote terminals and a computer, multiprocessor and multimachine communications (which permit constructing a computer network), as well as modules for communication with scientific equipment of the CAMAC system. Segments of multimachine computer networks were demonstrated. One network consisted of a SM-3 and SM-4 two-machine unit interconnected by an interprocessor connector, and an SM-4 connected to it by means of long-range communications. On the upper level a YeS-1055 computer was connected to the SM EVM unit by means of an intermachine connector. A multipanel real-time system was realized on the basis of that network, as well as a distributed information retrieval system.

The SM-1 and SM-2 process control computer complexes have speeds of 400,000 and 460,000 operations per second respectively and immediate-access storage volumes of 32K and 128K words respectively.

The SM-3 and SM-4 process control computer complexes have speeds of 250,000 and 800,000 operations per second respectively and immediate-access storage volumes of 32K and 128K words respectively.

Automated design systems (SAPR) realized with the use of YeS EVM, SM EVM, problem-oriented ARM [automated work site] complexes and standard operating systems are intended for the automation of planning and design work of various branches of industry.

Represented in the SAPR subsection from the USSR were: a unified system of automated design (YeSAP) of electronic computer technology (EVT); an ARM; a graphic complex of general purpose SM EVM computers; automation of design work in construction.

The YeSAP EVT was created and continues to be improved by the combined efforts of CEMA member-countries that are participating in the development and manufacture of YeS EVM.

The system will be used for the creation of large electronic computer systems with a volume of about 10 million integrated circuits.

The solution of the above tasks is assured by the practical programs that are the property of problem-oriented automated design systems (SAPR).

Effectiveness of ARM work and improvement of the functional efficiency of the SAPR are achieved thanks to the active graphic interaction of the user with the program and the computer; by the reduction of the time required for the solutions as a result of operative depiction of the intermediate and final results of designing; the possibility of examining in a short time several alternatives of designs or circuits of an article before adopting a final decision; and the possibility of creating and using a data bank of standard ARM and SAPR solutions.

Use of the ARM permits accelerating the process of designing printing plates by 2.6 times, control programs for numerical peripherals by 3.3 times, flow routes by 3 times and the preparation of data for SAPR by 3-5 times.

The SM EVM graphic unit assures the effective solution of tasks of computer graphics thanks to active interaction of the user and the computer. The unit consists of an SM-4 process control computer complex with an immediate-access storage with a capacity of at least 32K words and an external magnetic disk storage and an EPG-SM graphic display with a luminous pen and alphanumeric and functional keyboards.

The architecture of the graphic unit allows different alternatives of its use: autonomous, as the basic graphic nucleus of larger complexes and as the graphic terminal of the main computer in a hierarchic automated design system. The universal interface "Common Bus" permits readily enlarging the complex to the configurations determined by the areas of application.

In the demonstrated configuration the SM EVM graphic complex can be used in the preparation of programs for machine tools with numerical peripherals, for architectural and structural composition, engineering designing and calculations in construction, machine building, etc, for the modeling of transport tasks, electronic modelling, etc.

Effectiveness of an SM EVM graphic complex is assured by active graphic interaction of the user with the program, reduction of the time required for the adoption of principal decisions, acceleration of drawings, reduction of the time and improvement of the quality of preparation for production, and the possibility of using a standard solutions data bank in work in a hierarchic automated design system (SAPR).

The work of the complex is maintained by DOS ARM and FOBOS operating systems.

Tasks in the preparation of programs for machine tools with numerical peripherals and of a program of architectural-structural composition were demonstrated.

The ARM complex for construction designing (ARM-S) is intended for scientific research work on the selection of the configuration and structure of hardware

The YeSAP EVT accomplishes by means of automation of the process of design and adjustment of computers, including the modelling, diagnosis, designing and documentation of various devices and separate structures. The system of documentation is so constructed that it automatically produces and controls the finished product with a considerable reduction of expenditures on the technological preparation of production, thanks to which the process of organization of articles in series production and the quality of production is improved.

The programming of the system is based on YeS EVM hardware. The selected principle of construction of the system permits increasing its functional possibilities during multilateral participation of the developers.

In the exposition a part of the programming of the system was shown that permits preparing in a dialog regime the starting data on the design, monitoring the correctness of circuits, correcting circuits, automatically creating controlling tests, modeling circuits, designing individual structural units and issuing the design part of the documentation.

The ARM was developed jointly by enterprises of the Ministry of Radio Industry and the Ministry of Instrument Making, Automation Equipment and Control Systems.

The demonstrated unit based on an SM-3 process control computer complex represents an automated design system (SAPR) terminal. The composition of the ARM hardware guarantees the conducting of work on the input of graphic and alphanumeric data, its depiction on the screens of graphic and alphanumeric displays, the editing of information and also the obtaining of documentation and control perforated tapes for the manufacture of articles in production.

The work of the ARM in the composition of an SAPR and in autonomous is maintained by the supporting systems DOS [disk operating system] ARM, BPO [expansion not given] ARM and the "Grif" graphic system. The programming includes a test monitoring system which monitors the working capacity of ARM hardware with automatic recording of the results of monitoring on the screen of an alphanumeric display.

In the configuration presented at the exhibition the ARM solves problems typical for different branches of industry: the designing of printing plates with high density of the composition; the preparation of programs and issuance of control perforated tapes for machine tools with numerical peripherals; the designing of mechanical parts of simple form; the issuance of text and graphic documentation and other tasks not requiring large volumes of calculations.

In the SAPR based on the YeS EVM and SM EVM, ARM complexes are solving tasks in the designing of digital and analog circuits, uhf devices, micro-assemblies, machine structural parts of simple form, and also press molds and stamps.

and software of systems for automated design of objects of construction and for use as subscriber points.

The subsystem for automated formation of design solutions of objects of construction based on the YeS EVM is intended for automation of processes in the development of main design solutions; it permits analyzing the effectiveness of alternatives, determining the values of technical and economic indicators and controlling the quality of the solution alternatives under consideration.

In the subsection "Systems for the automation of scientific experiment," systems constructed on the basis of the following SM EVM hardware series produced in the socialist countries were demonstrated: SM-3, SM-4, IVK-1 - IVK-3 (USSR); RK-SM-3 (CSSR); SM 52/20 (Poland)--connected with a YeS-1045; SM 50/10 (GDR), and also systems based on the YeS EVM that were presented by Hungary, CSSR and the USSR: the YeS-1011 (Hungary), connected with the YeS-1045 (USSR) and the ADT 4500 (CSSR).

A multiterminal system for the gathering and processing of experimental data for subdivisions of scientific research institutes is intended for the control of scientific experiments and the solution of organizational and reference problems. It gathers, monitors and processes information in real time. Thanks to its modular structure and the selected method of organizing the computational processes, an increase of the effectiveness of scientific investigations and of the quality of control of the processes is assured.

The system is constructed on the basis of the SM-4 computer with IVK-1 and IVK-2 measurement units in single- and multimachine complexes, with the use of medium and large YeS EVM computers on the upper level.

The system presents the following principal possibilities to users: independent parallel performance of tasks initiated from several terminals, including remote termials; a multiprogram regime of problem solution in real time; the planning of starting and control of tasks on the basis of priorities; a developed system of file management on data carriers of various kinds; dynamic distribution of the immediate-access storage among tasks accomplished in parallel; a multilevel system of control of data input and output, including work with lines of communication; the generation of a system under a different configuration of the hardware; access to resources of the computer of the upper level from a terminal of the system and from the level of the tasks to be performed; a developed system of programming means, especially translators from high-level languages for the writing of programs working in real time.

The system's equipment includes an SM4P central processor, an immediate-access storage with a capacity of 128K words, an IZOT-1370 magnetic disk store, a perforated tape input-out device, an alphanumeric printer, USVM [expansion not given] --connection with a YeS-1060; a long-range communications adapter.

The hardware can be expanded by additional magnetic disk stores to 4, and by terminals, the number of which is determined by the volume of the computer storage.

The system has been developed on the basis of a real-time operating system.

A measurement complex for investigations in the area of reflexotherapy that was displayed at the exhibition permits observing the dynamics of the electrical resistance of about 300 points on the organism and preparing recommendations on therapy (the resistance of the skin of different sections of the body is an informative diagnostic indicator in reflexotherapy).

A simplified variant of measurements at 24 points on the distal sections of the hands and feet was demonstrated.

The "Mayak-1" measuring-computing station is a component part of the multicomputer automatic complex developed at the Leningrad Institute of Nuclear Physics imeni B. P. Konstantinov of the USSR Academy of Sciences. It consists of an IVK-1 complex and a CAMAC crate with specialized modules oriented toward application with semiconductor detectors of nuclear radiation.

The "Mayak-1" is a set of hardware and software that permits providing multichannel amplitude analysis of signals arriving from nuclear radiation detectors. Its main area of application is tasks of experimental physics of low and medium energies.

The station includes an SM-3 computer in the basic complex: functional CAMAC modules from an IVK-1, a number of specialized functional CAMAC modules and information displays (raster displays).

The set of modules shown at the exhibition assures the amplification and formation of signals of semiconductor detectors of nuclear radiation, the conversion of amplitude into a code, stabilization of the characteristics of measurement channels, the discrimination of pulses, organization of multiparameter measurements and also the presentation of graphic and textual information.

Demonstrated at the exhibition was an automated system for investigations of chemical and biological objects by the method of electronic paramagnetic resonance, constructed on the basis of SM-1 - SM-3 computers. It is used widely in many areas: in biology and chemistry, for determination of the degree of contamination of the air, soil and water by production wastes, in agriculture, etc.

The solution of these problems without the use of computers is either ineffective or impossible. The displayed system increases the load of the basic equipment by 3-4 times, the precision of the experiment by 30-40 times and the data processing rate by about 400 times. The most important thing is that the application of the system greatly increases the information output of experiments and frees the researcher from routine work.

The IVK-8 measuring and computing complex demonstrated in this section, with high precision, is intended for the commutation, digital measurement and

registration of direct current signals, the programmed gathering, storage and processing of measured data and the issuance of control actions, and can be used in systems for the automation of scientific research. The complex includes a programmed calibrator--a source of pattern signals that permits accomplishing periodically an automatic metrological attestation of 100 measurement channels, assuring maintenance of the precision of measurement of input signals in the prescribed range (in the range of 0.1 percent).

Along with achievements in the area of the development, production and application of computer hardware, at the exhibition in the "Hardware" section was demonstrated an effective international system of complex servicing of hardware [sistema kompleksnogo obsluzhivaniya SVT -- SKO SVT], in which organizations and enterprises of the USSR, CSSR, Hungary, Poland, GDR, Romania, Cuba and Bulgaria.

At the present time the SKO SVT performs the following types of work on hardware: its introduction into operation, warranty repair, technical servicing, delivery, introduction into operation and accompaniment of software, consultative servicing of users and centralized instruction of their personnel.

In the USSR the introduction of hardware, delivery, introduction into operation and accompaniment of software of YeS computers are accomplished by service organizations. Forty percent of the YeS EVM equipment has been transferred to centralized servicing. A network of training centers has been created for teaching and improving the qualifications of specialist users of the YeS computers, a network that in the very near future will permit completely satisfying the demand for the training of specialists.

Demonstrated at the exhibition was a list of guiding normative documents and sets of documents defining the technological process of the SKO SVT as regards services of all types, training documentation and the organizational structure of the regional service center.

Shown at the exhibition was a natural fragment of a training class with the necessary instruments and equipment -- screens, video recorders, displays and simulators (USSR, GDR, Hungary, Romania and Poland).

The central SKO SVT dispatcher service in the GDR was demonstrated; it connects the chief dispatcher of the Robotron Company with the NOTO [expansion not given] of the countries participating in the agreement on collaboration in the area of the development, production and application of computer hardware, and monitors the introduction into use and the technical state of GDR-produced computers in all the countries.

Documentation of standard modules for the disposition of hardware, models of computer centers and full-scale models of the interior of computer centers were presented.

Working models of stands for the inspection and repair of typical spare parts were exhibited, as were tool sets and auxiliary equipment (cabinets for the storage of magnetic tapes and disks, carts, etc) and a mobile maintenance and technical workshop.

The exhibition demonstrated important achievements of countries participating in the agreement on the development, production and application of computer hardware. Over 100,000 specialists from various countries visited the exhibition.

[133-2174]

2174
CSO: 1863

II. ECONOMIC APPLICATIONS

A. Over-all Planning Methods

UDC 025.4.02:006.015.2:002

GOSPLAN PLANNING CALCULATION SYSTEM ADDS UNIFORM CODES, DOCUMENTS

Moscow KLASSIFIKATORY I DOKUMENTY in Russian No 9-10, 1979 pp 5-7

[Articles by candidates in technical sciences N. N. Fedotov and E. F. Penchik, Main Computing Center of USSR Gosplan: "Experience with the Introduction of OK TEI's and UDS's in the Automated System of Planning Calculations"]

[Text] In 1977 the divisions and Main Computing Center of USSR Gosplan, in cooperation with scientific research and planning organizations, developed and introduced the first phase of the Automated System of Planning Calculations (ASPR) of USSR Gosplan. The calculations used in compiling plans for economic and social development of the USSR are made within this system. About two-thirds of the documents submitted to the USSR Council of Ministers in the draft plan for 1979 were produced by machine.

The participation of a large number of organizations in development of national economic plans using computer equipment, the need for close cooperation among the organizations, and the necessity of transmitting and processing large masses of information make the questions of improving software, in particular development of means of formalized data description (SFOD), paramount. Unionwide classifiers of technical and economic information (OK TEI's) are one of the key components of SFOD and software as a whole. Setting up a language for information exchange based on OK TEI's is a key prerequisite to achieving information compatibility among ASU's of different levels. The use of OK TEI's as a uniform conceptual-terminological base will make it possible to designate transmitted data unambiguously and eliminate uncertainty in shaping and processing data.

Code designations from OK TEI's used jointly with forms from the Unified System of Planning Documents (USPD) make it possible to combine the planning calculations done with computers into a single system and to organize the processes of data transmission to particular elements of the

ASPR and the processes of information exchange between the ASPR and the ASU's of USSR ministries and departments.

During the development of state plans for economic and social development the Union republic state planning committees and USSR ministries and departments transmit information to USSR Gosplan on standardized planning document forms using the code designations of OK TEI's, which makes it possible to designate the transmitted data unambiguously and preclude inaccuracy and errors in shaping and processing the data. The Main Computing Center of the USSR Gosplan processes the data received by computer, supplying the divisions of USSR Gosplan with the information they need to reach sound decisions during development of variations of the national economic plan. In the course of this work it is possible to make operational corrections in initial information using terminals installed at the divisions of USSR Gosplan and connected by communication channels with computers in the building of the Main Computing Center of USSR Gosplan.

The principal elements used in the ASPR to solve problems by computer are: Unionwide Classifier of Industrial and Agricultural Output (OKP), Unionwide Classifier of National Economic Sectors (OKONKh), System of Designations of State Administrative Agencies of the USSR and Union Republics (SOOGU), System of Designations of Administrative-Territorial Units of the USSR and Union Republics and Populated Points (SOATO), Unionwide Classifier of Enterprises and Organizations (OKPO), Unionwide Classifier of Jobs and Services in Agriculture (OKRUSKh), System of Designations of Units of Measure (SOYeI), and Unionwide Classifier of the World's Countries and Territories (OKSM).

The code designations of the OKP, in particular, are used for the products list in solving the problems of the ASPR subsystems "Summary National Economic Plan," "Foreign Economic Ties," and "Material Balances and Distribution Plans." These are the largest problems in the ASPR in terms of volume of data processed.

The OK TEI's used in the ASPR were developed by a number of organizations and scientific research institutes under the general methodological direction of USSR Gosplan and the USSR State Committee for Standards.

Introduction of a unified system of planning documents, including standardized document forms for the development of annual, five-year, and long-term plans of economic and social development of the country, at the Main Computing Center of USSR Gosplan permitted a significant reduction in number of types of planning documents, optimal adaptation of these documents to computer processing, improvement in the speed and reliability with which documents are filled out, and a rise in labor productivity during data processing. It also created the prerequisites for universal application of the uniform code designations of the OK TEI's in the ASPR.

The Main Computing Center of USSR Gosplan is conducting experimental projects on exchange of information on machine media with industrial ministries and Union republics based on OK TEI's and uniform document systems. This has made it possible to step up the performance of calculations in the ASPR and intensify the integration of processes in development of national economic plans.

Work is going forward to formulate a uniform vocabulary for the ASPR using OK TEI's and control systems for data banks. The ASPR vocabulary will make it possible to improve efficiency in processing economic planning data for all ASPR subsystems and to greatly reduce the labor-intensiveness of work on preparation and management of word information. OK TEI's and the Uniform System of Planning Documents are primary elements of the software of the ASPR of USSR Gosplan. They significantly accelerate computer planning calculations, make it possible to find and correct mistakes, and improve the timeliness, reliability, and quality of development of plans for economic and social development of the country.

[128-11176]

11176
CSO: 1863

B. Economic Control at National Level

UDC 025.4.02:006.015.2

UNIFORM CLASSIFIERS, DOCUMENTS BEING INTRODUCED NATIONWIDE

Moscow KLASSIFIKATORY I DOKUMENTY in Russian No 9-10, 1979 pp 1-4

[Article by candidates technical Sciences A. A. Sakov, VNIIKI, and I. P. Markov, State Committee for Standards: "Results of Formulation and Introduction of the Unionwide Classifier of Technical and Economic Information and the Uniform System of Documents and Prospects for Further Development of Them"]

[Text] The decisions of the November 1978 Plenum of the CPSU Central Committee emphasized the need to continue improving management of the national economy, raise the level of planning and management, and bring it into line with the requirements of the current phase, the phase of developed socialism.

Automated control systems (ASU's) are expected to play a large part in meeting this challenge.

The document "Basic Directions of Development of the USSR National Economy for 1976-1980," which was adopted by the 25th CPSU Congress, stated: "Insure continued development and improvement in the efficiency of automated control systems and computing centers, progressively joining them into a single nationwide system for the collection and processing of information for accounting, planning, and management."

ASU's today are operating and being planned in different spheres and at different levels of economic management. There are the automated systems of the central management agencies such as the ASPR (Automated System of Planning Calculations) of USSR Gosplan, the ASGS (Automated System of State Statistics) of the USSR Central Statistical Administration, the ASU of USSR Gossnab, and other intersectorial ASU's, the sectorial systems (OASU's) of the ministries and departments, the ASU's of associations (ASUO's), the ASU's of enterprises (ASUP's), and the automated systems of the Union republics (RASU's).

Effective functioning of all the automated control systems requires uniform software, which makes it possible to perform specific tasks within the framework of particular ASU's and to exchange information among them, that is, creates conditions for cooperation among ASU's in different spheres and on different levels. In other words, the ASU's must achieve information compatibility as one of the conditions for their integration.

Uniform ASU software includes the Uniform System of Classification and Coding of Technical and Economic Information (YeSKK TEI), which includes a set of unionwide classifiers of technical and economic information (OK TEI's) and uniform systems of documents (USD's).

Within the State Committee for Standards the job of providing uniform methodological and organizational leadership for this work has been assigned to VNIIKI [All-Union Scientific Research Institute of Technical Information, Classification, and Coding].

In all, 530 organizations from more than 100 ministries and departments took part in work on the uniform systems of classification-coding and documents.

The ministries, departments, and Union republics named more than 100 head organizations for OK TEI and USD, in a list ratified by the State Committee for Standards, to carry out uniform technical policy with respect to the classification of technical and economic information and standardization of documents.

Twenty-five Unionwide classifiers with a total of about 20 million items were developed and ratified.

The Automated System for Management of Unionwide Classifiers (ASVOK TEI) is being set up to keep the Unionwide classifiers in reliable condition, make operational changes and supplements, and provide timely, reliable, and complete information to the national economy on the composition and content of the OK TEI's. The first phase of the system was launched in industrial operation in 1975.

Alongside the OK TEI's 16 uniform systems of documents were developed containing fundamental state standards. On this basis the ministries and departments worked out the sets of unified document forms (about 4,000) that are included in the Unionwide Classifier of Management Documents (OKUD).

Further development of uniform document systems envisions insuring mutual exchange of unified documents on machine media and along communication channels between ASU's and computing centers of different levels, development of technical norms and methodological instructions containing the basic requirements for documents on machine media, and carrying out projects based on state standards to standardize sectorial documents

envisioning their use in republic, sectorial, and enterprise ASU's and meshing with existing standardized intersectorial document forms.

The State Committee for Standards ratified the set of more than 40 organizational and methodological documents developed by VNIIKI on the formulation, introduction, and management of Unionwide classifiers and uniform document systems in ASU's. These documents allow the introduction of OK TEI's on a uniform basis.

Work on the introduction of OK TEI's and USD's in the country's economy today is carried on in conformity with the decree of the State Committee for Standards entitled "Progress in Introduction and Further Development of Unionwide Classifiers of Technical and Economic Information and Uniform Systems of Documents."

Experience with introducing them has shown that the Unionwide classifiers and standardized document forms are used widely in ASU's at different levels and in more than 15 functional subsystems, above all technical and economic planning, operational management, and management of material-technical supply and marketing.

In connection with the special role of OK TEI's and USD's in the software of high-level ASU's (ASPR, ASGS, the ASU of USSR Gossnab, and others), the central administrative agencies, that is USSR Gosplan, the USSR Central Statistical Administration, USSR Gossnab, and the USSR State Committee for Prices, have begun working extensively on the introduction of OK TEI's and USD's.

In addition to universal introduction of first-phase OK TEI's and USD's, the formulation of second-phase OK TEI's and USD's is being completed.

The composition of third and fourth phase Unionwide classifiers is being determined within the bounds of work on further development of the Uniform System of Classification and Coding.

The introduction of OK TEI's in the state system of standardization is a key step.

It must be considered that the system of national economic and social planning and the state system of standardization constitute the organizational-technical foundation of the Uniform System for Control of Product Quality.

The following steps are essential to accelerate the process of introduction of OK TEI's and USD's in the national economy: further activation of work by head organizations on OK TEI's and USD's; generalization of progressive know-how on the use of OK TEI's and USD's and universal dissemination of such know-how; broadening the range of management problems performed by ASU's on the basis of OK TEI's and USD's, above all those

problems which, because of their particular importance and complexity, can only be fully resolved using computer equipment. These steps should insure rational and economic use of resources.

In this way, setting up the Uniform System of Classification and Coding and Uniform Document Systems will insure the conditions that are essential for ASU's to become an important means of raising the efficiency of public production and improving product quality.

[128-11176]

11176
CSO: 1863

III. INFORMATION SCIENCE

A. Information Services

UDC 006.1:001.4:001.8:002.6

PROGRESS ON STANDARDIZATION OF SCIENTIFIC-TECHNICAL TERMINOLOGY

Moscow KLASSIFIKATORY I DOKUMENTY in Russian No 9-10, 1979 pp 96-97

[Article by I. N. Volkova, VNIIKI: "Standardization of Scientific-Technical Terminology and Its Link to the Uniform System of Classification and Coding of Technical and Economic Information"]

[Text] Work on standardization of scientific-technical terminology has become widespread in the last 10-12 years. In this time more than 600 state and 100 sectorial terminology standards have been developed and ratified, establishing more than 60,000 standardized terms in different fields of science and engineering.

To insure the necessary methodological uniformity in these projects and carry them out at the appropriate level a set of methodological materials was formulated that regulates the procedure for development and scientific-technical expert examination of terminology standards and examination of draft standards of all types by terminology experts.

The Reference Bank of Terms (SBT) has been formed. It includes terminology standardized in our country that was established by standards of CEMA, ISO [International Organization for Standardization], and IEC [International Electrotechnical Commission] and recommended for use by the Committee on Scientific-Technical Terminology of the Academy of Sciences USSR, a total of 120,000 terms. The Reference Bank of Terms has the form of cards and microfilms. It afforded the basis for development of the first phase of the Automated System for Information-Terminology Service (ASITO). Work is now underway to refine the ASITO using YeS-1022 computers. The objective of this work is to expand the access capacities of the system, make it compatible with AIUS [Automated Information Control System] of the USSR State Committee for Standards, and formulate a package of applied programs to distribute and transmit them to head organizations responsible for terminology work in the sectors.

Based on the Reference Bank of Terms VNIIKI [All-Union Scientific Research Institute of Technical Information, Classification, and Coding]

provides information-terminology service to head and base organizations for standardization who are responsible for terminology work in the sectors. Standardized scientific-technical terminology is one of the means of insuring compatibility among automated control systems of different levels and functions. Standards for terms and definitions together with Unionwide classifiers of technical and economic information are an important component of the information and linguistic support of ASU's.

Both Unionwide classifiers of technical and economic information and standards for terms and definitions are technical norm documents and in many cases contain identical lexical units: names, terms, and abbreviations of various types (lexical and graphic). Therefore, it becomes especially important to reconcile and coordinate them. This is particularly urgent in connection with the development of the Automated System for Management of Unionwide Classifiers of Technical and Economic Information (ASVOK TEI) and ASITO and the creation of two highly overlapping lexical arrays for them on machine media.

In view of this, it is essential to envision closer mutual coordination during further refinement of the Uniform System of Classification and Coding of Technical and Economic Information and work on standardization of scientific-technical terminology.

Concrete standards for terms and definitions should be developed with due regard for Unionwide classifiers of technical and economic information that have been ratified (during systematization of concepts, evaluation and selection of terms to be standardized, and so on).

When new Unionwide classifiers of technical and economic information are being developed and changes made in existing ones, during the expert examination they should be checked to see that the words in them correspond to standardized terms.

When formulating automated systems for management of Unionwide classifiers of technical and economic information and for information and terminology service, it is essential to take necessary steps to insure cooperation between the two data banks in the mode of exchange of terminology information on machine media and in the video access mode. Studies directed to devising an agreed-upon format for recording terminology information and software should be done for this purpose.

[128-11176]

11176
CSO: 1863

IV. GENERAL INFORMATION

A. Personalities

LIST OF AUTHORS, TITLES, AFFILIATIONS FROM JOURNAL 'KIBERNETIKA'

Kiev KIBERNETIKA in Russian No 5, 1979 p 152

[List: "Information about Our Authors"]

[Text] Avetisyan, Gayk Gevorkovich, graduate student at the IK AN USSR [Institute of Cybernetics of the Academy of Sciences Ukrainian SSR], Kiev

Aleyev, Vladimir Rostislavovich, mathematician and programmer, University of International Friendship imeni Patrice Lumumba

Andon, Filipp Illarionovich, candidate in physicomathematical sciences, division manager of the SKB [Special Design Bureau] of IK AN USSR, Kiev

Anisimov, Anatoliy Vasil'yevich, candidate in physicomathematical sciences, docent of Kiev State University

Beresnev, Vladimir Vladimirovich, candidate in physicomathematical sciences, senior scientific associate, Kiev

Brodetskiy, Gennadiy Leonidovich, candidate in physicomathematical sciences, docent of Kiev Construction Engineering Institute

Valuyskiy, Vyacheslav Nikolayevich, candidate in technical sciences, assistant Kiev Polytechnic Institute

Val'kovskiy, Vladimir Aleksandrovich, candidate in physicomathematical sciences, senior scientific associate of the Computing Center of SO AN SSSR [Siberian Department of Academy of Sciences USSR], Novosibirsk

Vasil'yev, Yuriy Porfir'yevich, candidate in physicomathematical sciences, senior teacher at Irkutsk State University

Vedenin, Dmitriy Rostislavovich, graduate student at Leningrad State University

Glushkov, Viktor Mikhaylovich, academician, director of IK AN USSR, Kiev

Danilin, Yuriy Mikhaylovich, doctor of physicomathematical sciences, senior scientific associate at IK AN USSR,Kiev

Zhezherun, Aleksandr Petrovich, engineer at IK AN USSR,Kiev

Zhuk, Konstantin Danilovich, doctor in technical sciences, division head at IK AN USSR

Ivanenko, Leonid Nikolayevich, candidate in physicomathematical sciences, senior scientific associate at IK AN USSR, Kiev

Ivanov-Muromskiy, Kirill Aleksandrovich, doctor in biological sciences, division head at IK AN USSR, Kiev

Kaniovskiy, Yuriy Marianovich, candidate in physicomathematical sciences, junior scientific associate at IK AN USSR

Katsev, Sergey Borisovich, junior scientific associate at Leningrad Electrical Engineering Institute

Knopov, Pavel Solomonovich, candidate in physicomathematical sciences, senior scientific associate at IK AN USSR, Kiev

Kozina, Alla Viktorovna, junior scientific associate at Institute of Sociological Research of AN SSSR [Academy of Sciences USSR], Moscow

Kosarev, Valentin Vasil'yevich, candidate in physicomathematical sciences, senior scientific associate at Sevastopol' Instrument Making Institute

Kuksa, Anatoliy Ivanovich, candidate in physicomathematical sciences, senior scientific associate at IK AN USSR, Kiev

Levin, Vitaliy Il'ich, doctor in technical sciences, department head at higher technical institute-plant, Penza

Mansurov, Vladimir Nikolayevich, candidate in physicomathematical sciences, docent at University of International Friendship imeni Patrice Lumumba

Marchuk, Aleksandr Vladimirovich, senior engineer at IK AN USSR, Kiev

Morar', Vasiliy Antonovich, graduate student at IK AN USSR, Kiev

Nakonechnyy, Aleksandr Grigor'yevich, candidate in physicomathematical sciences, docent at Kiev State University

Nasekin, Vladimir Yakovlevich, senior engineer at Rostov Instute of Rail Transport Engineers

Nikolenko, Vladimir Nikolayevich, graduate student at IK AN USSR, Kiev

Reshetnikov, Valeriy Nikolayevich, senior teacher at Moscow State University

Romankevich, Aleksey Mikhaylovich, candidate in technical sciences, docent at Kiev Polytechnic Institute

Romanovskiy, Iosif Vladimirovich, doctor in physicomathematical sciences, professor at Leningrad State University

Tur, Lyudmila Petrovna, candidate in physicomathematical sciences, senior scientific associate at IK AN USSR, Kiev

Filonenko, Nadezhda Vasil'yevna, senior engineer at IK AN USSR, Kiev

Tseytlin, Georgiy Yevseyevich, candidate in physicomathematical sciences, senior scientific associate at IK AN USSR, Kiev

Chebotarev, Anatoliy Nikolayevich, candidate in technical sciences, senior scientific associate at IK AN USSR, Kiev

Chikriy, Arkadiy Alekseyevich, candidate in physicomathematical sciences, senior scientific associate at IK AN USSR, Kiev

Chikriy, Gretkhen Tsolakovna, candidate in physicomathematical sciences, junior scientific associate at IK AN USSR

Ergashev, Gani, candidate in physicomathematical sciences, docent at Samarkand State University

Yukhimenko, Birute Ionovna, senior teacher at Odessa Polytechnic Institute
[124-11176]

11176
CSO: 1863

LIST OF AUTHORS, TITLES, AFFILIATIONS FROM KIEV JOURNAL

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, 1979 p 144

[List: "Our Authors"]

[Text] Abakumov, Valentin Georgiyevich, k.t.n. [candidate in technical sciences], KPI [Kiev Polytechnic Institute], Kiev

Andreyev, Nikolay Yevgen'yevich, engineer, IK AN USSR [Institute of Cybernetics of the Academy of Sciences Ukrainian SSR], Kiev

Artem'yev, Anatoliy Alekseyevich, engineer, Leningrad Special Start-Up and Debugging Administration of the Sevzapmontashavtomatika Trust, Leningrad

Bakayev, Aleksandr Aleksandrovich, corresponding member of AN USSR [Academy of Sciences Ukrainian SSR], IK AN USSR

Balashov, Yevgeniy Pavlovich, d.t.n. [doctor in technical sciences], LETI [Leningrad Electrotechnical Institute imeni V. I. Ul'yanov], Leningrad

Balodis, Rikhard Petrovich, st.n.s. [senior scientific associate], Computing Center of Latvian State University, Riga

Batyrev, Yevgeniy Vasil'yevich, k.t.n., MIET [Moscow Institute of Electronics Engineering], Moscow

Blinov, Yuriy Aleksandrovich, st.n.s., Machine Building Institute, Voroshilovgrad

Bryukhovich, Yevgeniy Ivanovich, d.t.n. IK AN USSR, Kiev

Bykov, Nikolay Ivanovich, engineer, Omsk

Visikirskiy, Vladimir Anatol'yevich, graduate student at IK AN USSR, Kiev

Vysotskaya, Klavdiya Vasil'yevna, engineer, Kiev Branch of VIIASM [listed elsewhere as VIASM =All-Union Scientific-Research and Planning and Design Institute for Automation of Enterpreises of the Construction Materials Industry], Kiev

Grabovskiy, Bronislav Aleksandrovich, ml.n.s. [junior scientific associate], IK AN USSR

Gritsenko, Vladimir Mikhaylovich, k.t.n., TsNIIKA [State All-Union Central Scientific Research Institute of Complex Automation], Moscow

Dodonov, Stanislav Borisovich, k.t.n., IK AN USSR, Kiev

Dubintsev, Yelena Vital'yevna, engineer, IK AN USSR, Kiev

Zavadskiy, Petr Ivanovich, k.t.n., Special Design Bureau of Industrial Automation, Omsk

Zaytsev, Nikolay Georgiyevich, d.t.n., IK AN USSR, Kiev

Kovartsev, Aleksandr Nikolayevich, engineer, Kuybyshev Aviation Institute, Kuybyshev

Kompel'makher, Vladimir Leonovich st.n.s., TsNIITU [Central Scientific Research and Planning and Technological Institute of Control Engineering], Minsk

Komukhayev, Eduard Ignatovich, k.t.n., IK AN USSR, Kiev

Kondratenkov, Vladimir Aleksandrovich, k.t.n., KVVIAU VVS [expansion unknown], Kiev

Kondrat'yev, Yevgeniy Ivanovich, engineer, Kiev branch of VIASM, Kiev

Kondrashov, Valeriy Pavlovich, engineer, Sverdlovsk

Korablin, Mikhail Aleksandrovich, k.t.n., Kuybyshev Aviation Institute, Kuybyshev

Korobeynikov, Valeriy Nikolayevich, k.t.n., SKB MMS IK AN USSR [Special Design Bureau of (Mathematical Machines and Systems) IK AN USSR], Kiev

Korostil', Yuriy Miroslavovich, engineer, VISP [expansion unknown], Kiev

Koresunskiy, Vladimir Moiseyevich, k.t.n., IK AN USSR, Kiev

Kosinov, Nikolay Vasil'yevich, engineer, Kiev

Kramarenko, Vladimir Vasil'yevich, engineer, Metallurgical Plant, Dneprodzerzhinsk

Krasovskiy, Grigoriy Yakovlevich, k.f.-m.n. [candidate in physicomathematical sciences], VNII po Okhrane Vod [All-Union Scientific Research for Protection of Water], Kharkov

Krasnokutskiy, Nikolay Grigor'yevich, engineer, KiAPO [expansion unknown], Kiev

Kuz'menko, Galina Yevdokimovna, engineer, SKB MMS IK AN USSR, Kiev

Kurdyumov, Ivan Savil'yevich, k.f.-m.n., NII ASU pri Gosplane RSFSR [Scientific Research Institute of ASU's of RSFSR Gosplan], Moscow

Kur'yanova, Natal'ya Ivanovna, engineer, NII EVM [Scientific Research Institute of Computers], Minsk

Levin, Nison Abramovich, d.t.n., INEUM [Institute of Electronic Control Machines], Moscow

Leskin, Vladimir Fateyevich, k.t.n., Kiev Polytechnic Institute, Kiev

Litvinov, Valeriy Andronikovich, k.t.n., Institute of Automation, Kiev

Lyubarskiy, Valeriy Fedorovich, engineer, IK AN USSR, Kiev

Matitskas, Ionas-Kazis Leono, k.t.n., Kaunas Polytechnic Institute, Kaunas

Mel'nik, Ivan Mikhaylovich, k.f.-m.n., IK AN USSR, Kiev

Milyutin, Valeriy Vyacheslavovich, k.t.n., NIIkhimmash [Scientific Research Institute of Chemical Machinery], Moscow

Morozov, Anatoliy Alekseyevich, k.t.n., SKB MMS IK AN USSR

Mosolova, Mariya Vladimirovna, ml.n.s., NII ASU pri Gosplane RSFSR

Musiyaka, Yevgeniy Vsevolodovich, engineer, VNIISP [expansion unknown], Kiev

Mushka, Vera Mikhaylovna, engineer, IK AN USSR, Kiev

Nazaykinskiy, Vladimir Yevgen'yevich, ml.n.s., NII ASU pri Gosplane RSFSR, Moscow

Naumov, Boris Nikolayevich, corresponding member of Academy of Sciences USSR, INEUM, Moscow

Novikov, Vladimir Andreyevich, k.t.n., NII Problem Vysshey Shkoly [Scientific Research Institute of Problems of Higher Education], Moscow

Novikov, Gennadiy Ivanovich, d.t.n., LITMO [Leningrad Institute of Precision Mechanics and Optics], Leningrad

Oleynik, Tat'yana Grigor'yevna, k.e.n. [candidate in economic sciences], IK AN USSR, Kiev

Orlov, Yevgeniy Vasil'yevich, k.t.n., Moscow

Osipov, Bogdan Levonovich, k.t.n., MAI [Moscow Institute of Aviation imeni Sergo Ordzhonikidze], Moscow

Ostafin, Viktor Antonovich, k.t.n., KPI, Kiev

Pavlov, Vladimir Pavlovich, graduate student, LITMO, Leningrad

Pavlov, Vladimir Nikolayevich, graduate student, MIET, Moscow

Pobednov, Viktor Aleksandrovich, engineer, LETI, Leningrad

Polos'mak, Vladimir Mikhaylovich, engineer, KiAPO, Kiev

P'yavchenko, Oleg Nikolayevich, k.t.n., OKB TRTI [Experimental Design Bureau of Taganrog Radio Engineering Institute], Taganrog

Pyatnitskiy, Gennadiy Vladimirovich, engineer, Kiev Branch of VIASM, Kiev

Repetskiy, Vladimir Leonidovich, engineer, KiAPO, Kiev

Romanenko, Yevgeniy Vladimirovich, engineer, IK AN USSR, Kiev

Romankevich, Aleksey Mikhaylovich, k.t.n., KPI, Kiev

Romm, Yakov Yevseyevich, engineer, OKB TRTI, Taganrog

Rudenko, Viktor Dmitriyevich, teacher KVIRTY PVO [Kiev Military Engineering Radiotechnical School of the Air Defense Forces], Kiev

Rukshin, Aleksandr Grigor'yevich, engineer, Leningrad Special Start-Up and Debugging Administration of Sevzapmontazhavtomatika Trust, Leningrad

Savel'yev, Aleksandr Yakovlevich, d.t.n., NII Problem Vysshey Shkoly, Moscow

Sazonov, Aleksandr Afanas'yevich, d.t.n., MIET, Moscow

Sangurskiy, Vladimir Sergeyevich, engineer, Institute of Automation, Kiev

Sannikova, Tat'yana Pavlovna, engineer, Sverdlovsk

Semesenko, Mikhail Porfir'yevich, k.t.n., Machine Building Institute, Voroshilovgrad

Sekhan, Oleg Mikhaylovich, k.e.n., VNITI [Possibly All-Union Scientific Research Institute of Pipes], Dnepropetrovsk

Sigalov, Gdaliy Grigor'yevich, k.t.n., NII EVM, Minsk

Slyn'ko, Valentin Ivanovich, engineer, VNIIPKNeftekhim [expansion unknown], Kiev

Stepanenko, Nataliya Yakovlevna, st.n.s., VNITI, Dnepropetrovsk

Surzhenko, Igor' Feodos'yevich, engineer, OKB TRTI, Taganrog

Tuzov, Viktor Mikhaylovich, k.f.-m.n., MEIS [Moscow Electrotechnical Institute of Communications], Moscow

Tyutin, Anatoliy Alekseyevich, k.t.n., IK AN USSR, Kiev

Fridman, Vitaliy Moiseyevich, k.t.n., VNITI, Dnepropetrovsk

Khvoshch, Sergey Timofeyevich, k.t.n., LETI, Leningrad

Shamashov, Mikhail Anatol'yevich, engineer, Kuybyshev Aviation Institute, Kuybyshev

Shevchenko, Yuriy Tarasovich, st.n.s., VNITI, Dnepropetrovsk

Shishlov, Valeriy Il'ich, engineer, SKB MMS IK AN USSR, Kiev

Yakuba, Anatoliy Aleksandrovich, k.t.n., IK AN USSR, Kiev
[126-11176]

11176
CSO: 1863

B. Publications

UDC 614.2:519.24

COMPUTING TECHNOLOGY IN HEALTH CARE

Moscow VYCHISLITEL'NAYA TEKHNIKA V ZDRAVOOKHRANENII (OPYT SOZDANIYA EKSPERIMENTAL'NYKH INFORMATSIONNO-POISKOVYKH SISTEM) (Computing Technology in Health Care: Experience Obtained in Development of Information Retrieval Systems) in Russian 1979 signed to press 15 Nov 78 pp 2, 166

/Annotation and table of contents from book by Lev Viktorovich Koryakov, Izdatel'stvo "Meditsina," 2,340 copies, 167 pages/

/Text/ This monograph deals with the problems of computer applications in health care; foreign and domestic experience in using hardware for processing medical statistical information is analyzed; the general steps in developing systems of various classes for patient registration are discussed. Specific systems of various complexity developed for registration of oncologic patients are shown as examples of the possible application in specialized health care services of margin-punched cards, perforated media computing machines, electronic computers, optical readers and data transmission equipment. New forms of documentation for information retrieval systems, new coding principles, original classification of localization of malignant tumors, original information processing diagrams, special computer programs, etc. are presented. Special approaches to automation of quality control of patient dispensary systems, development of devices and systems for individual prognosis of the outcome of diseases, selection of medical treatment methods and diagnostics are presented. The systems, devices, diagrams and programs described in this book have been tried at competent institutions, found useful and therefore, under the appropriate conditions, can be used by oncologic clinics to solve a number of specific problems. In addition, these materials can be used to develop similar systems for other specialized services

This book is intended for physicians-organizers of health care engaged in improving specialized services by applying economic and mathematical methods and computer technology. It will also be useful to engineers engaged in designing automated systems for health care, as well as to scientific associates and physicians interested in the problems of processing medical statistical data.

This book contains 4 tables, 22 illustrations, 15 diagrams and there are 85 titles in the bibliography.

Contents

[144-8545]

8545
CSO: 1863

CYBERNETICS IN SYSTEMS OF MILITARY ASSIGNMENT

Moscow KIBERNETIKA V SISTEMAKH VOYENNOGO NAZNACHENIYA in Russian 1979 signed to press 16 May 1979, p 2-4, 260-263

[Annotation, introduction, bibliography, table of contents from book by Stanislav Konstantinovich Vasil'yev, Viktor Nikolayevich Zakharov and Uriy Fedorovich Prokhorov, Voyenizdat, 7,500 copies, 273 pages]

[Text] This book sets forth the principles of construction and the theoretical bases for the evaluation of the properties of systems of automatic control of military assignment. Much attention is devoted to methods of analysis and synthesis of systems using general purpose digital computers. Algorithms and programs in the ALGOL-60 and PL/1 algorithmic languages are given.

This book is intended for specialists working with the evaluation, analysis and planning of systems of automatic control and may be useful to students and officer candidates of military training institutions and also VUZ students.

This book makes use of material from unclassified Soviet and foreign literature.

Introduction

The Communist Party and Soviet government are very interested in the creation of automated and automatic systems, the development and improvement of which also have great significance for the strengthening of the defensive power of the Soviet Union. The decrees of the XXV Congress of the CPSU state that the complex automation of production and the creation of automated and automatic systems are among the most important and key means to improve the efficacy and quality of production. This is true in regard to systems with military purposes as well.

Among such systems are, for example, the rocket complexes, systems for control of rockets of various classes, systems to control airplane flight, systems for launching submarines etc. [2, 9, 12] which have been developed abroad.

The methods for the analysis and synthesis of systems, developed in cybernetics, presuppose the use of the fundamental principles of control and development of laws of control arising out of the requirements for

optimizing in regard to given criteria of efficacy. It is natural that cybernetic systems used for military purposes, in their development, testing, use and application, must also be created in accordance with these general principles and laws.

Aside from general requirements, systems with military purposes must often also meet specific requirements as well: increase in military preparedness, high accuracy of workmanship and reliability of functioning under complex combat conditions, long life, simplicity of maintenance and repair, unification and standardization of individual units, blocks, assemblies etc.

This book mainly examines methods of analysis and synthesis of systems of automatic control (SAU). Contemporary SAU for military purposes are created on the basis of computer technology, in particular digital computers. The use of digital computers in the circuit of control of the SAU permits as a rule, the creation of an effective system, which is capable of providing reliable control of the weapon under the complex conditions of a combat situation. Moreover, the analysis and synthesis of such systems is a complex and labor intensive process, the successful completion of which, requires, aside from the experience and intuition of the developer, the use of a general-purpose computer. For this reason, this book devotes much attention to the use of the computer for the automation of processes of analysis and synthesis of the SAU and gives programs in algorithmic languages ALGOL-60 and PL/1, which permit these processes to be realized. It should, however, be kept in mind that the programs are used basically for the analysis and synthesis of individual SAU's and do not solve the full range of problems in the synthesis of complex automated systems of control, where man (the operator) has the role of system controller.

The book was written by a group of authors: the introduction, chapters 1, 2 and 4 by V. N. Zakharov; chapters 3 and 9 by Ye. I. Makarenko, (section 3.6 with N. O. Ivanov and S. I. Surnov); chapter 5 by V. S. Sorokach; chapter 6, 7, 8 and section 9.5 by Yu. F. Prokhorov; chapters 10, 11, 12 and 13 by S. K. Vasil'ev.

Bibliography

1. Andreyev, N. I. Correlational theory of statistics of optimal systems, Moscow, 1968, 454 pp.

2. Andreoski. A structural diagram of a system of control of the flight of the "Minuteman" rocket. Issues in rocket technology, 1967, No 2 (146), pp. 88-102.

3. Barkovskiy, V. V., Zakarov, V. N., Shatalov, A. S. Methods of synthesis of a system of control. Moscow, Mashinostroyeniye, 1969, 327 pp.

4. Besekerskiy, V. A., Popov, Ye. P. Theory of systems of automatic regulation, Moscow, Nauka, 1972. 767 pp.

5. Borodin, V. T., Rylevskiy, G. I. Control of the flight of airplanes and helicopters, Moscow, Mashinostroyeniye, 1972, 239 pp.

6. Vasil'yev, S. K. A determination of the optimal system of control to maximize the probability that an error and its derivative do not surpass given tolerances. In book: Nonlinear and optimal systems. Moscow, Nauka, 1974, pp. 137-145.

7. Glushko, V. P. Permanent orbital stations.--Issues in rocket technology, 1974, No 4, pp. 3-10.

8. The dynamics of systems of control for rockets with airborne digital computers/V. D. Arens, S. M. Fedorov, M. S. Khitrik, S. V. Luchko. Moscow, Mashinostroyeniye, 1972, 271 pp.

9. Kastruchchio, Irbi. A digital system for stabilizing the "Skylab" orbital space station.--Issues in rocket technology, 1973, No 10, pp. 61-76.

10. Kozlov, V. I. Self-turning systems with relay elements. Moscow, Energiya, 1974, 88 pp.

11. Kozlov, Yu. M., Yusupov, R. M. Searchless self-tuning systems, Moscow, Nauka, 1969, 455 pp.

12. A shipboard system for control of the "Vega" weapon (translation).--Foreign military review; 1974, No 7, pp. 77-85.

13. Leonov, N., Viktorov, V. Anti-aircraft rocket complex "SAM-D," Foreign military review, 1974, No. 10, pp 37-43.

14. Methods in the theory of sensitivity in automatic control. Edit. Ye. N. Rosenvasser. Moscow, Energiya, 1971, 343 pp.

15. Nazarov, B. I., Khlebnikov, G. A. Rocket gyrostabilizers. Moscow, oyenizdat, 1975, 215 pp.

16. Nonlinear optimization of systems of automatic control. Edit. V. M. Ponomarev. Moscow, Vysshayashkola, 1974, 438 pp.

17. Fundamentals of automatic regulations and control. Moscow, Voyenizdat, 1972. 327 pp.

18. Popov, Ye. P. Applied theory of processes of control in nonlinear systems. Moscow, Nauka, 1973, 584 pp.

19. Pugachev, V. S. Theory of random functions and its application to problems of automatic control, Moscow, Fizmatgiz, 1963, 887 pp.

20. Radomirov, R. The antiship rocket "Automat."--Foreign military review, 1975, No 10, pp. 78-83.

21. The SRAM rocket of the class "air-earth" (review).--Issues in rocket technology, 1973, No 9, pp. 18-40.

22. Solodov, A. V. Methods in the theory of systems in the problem of continuous linear filtration, Moscow, Science, 1976, 263 pp.

23. Tu, Yu. T. Modern theory of control. Moscow, Nauka, 1971, 472 pp.

24. Tu, Yu. T. Digital and pulse systems of automatic control. Moscow, Nauka, 1964, 703 pp.

25. Fel'dbaum, A. A., Butkovskiy, A. G. Methods of the theory of automatic control, Moscow, Nauka, 1971, 743 pp.

26. Shatalov, A. S. Topchiyev, Yu. Ch. Kondrat'yev, O. S. Flying apparatus as objects of control. Moscow, Mashinostroyeniye, 1972, 239 pp.

27. Encyclopedia of cybernetics. Edit. V. M. Glushkov, Kiev, Glavnaya Redaktsiya Ukrainskoy Sovetskoy Entziklopedii, 1975, 122 pp.

Contents Page

[138-9385]

9285
CSO: 1863

UDC 621.3--523.8.002.56

DESIGNING COMPUTER CHECKOUT EQUIPMENT

Moscow KONSTRUIROVANIYE KONTROL'NO-ISPYTATEL'NOY APPARATURY DLYA EVM (Designing Computer Checkout Equipment) in Russian 1979 signed to press 13 Dec 78 pp 2-4, 301-302

/Annotation, preface and table of contents from book by Boris Nikolayevich Viktorov and Dmitriy Dmitriyevich Churabo, Izdatel'stvo "Mashinostroyeniye," 7,000 copies, 303 pages/

/Text/ This book deals with the fundamentals of design of equipment for checking and testing computer elements, assemblies, units and devices during manufacture and operation.

The requirements for computer checkout equipment and the principles of its construction are discussed; specific developments for electrical and other types of tests of computer assemblies are given. The problems of equipment standardization, organization of work areas, organization of design and manufacture, etc. are discussed.

This book is intended for engineers, technicians and designers associated with computer design and production.

Preface

The design and manufacture of checkout equipment (KIA) requires considerable time and resources. To reduce these outlays, the theory and practice of developing checkout equipment meeting the modern requirements of technical progress must be utilized seriously.

Checkout, test, adjustment and regulation are integral elements of computer manufacture. And checkout equipment is just as important in computer operations.

Checkout systems which provide both manual and semiautomatic and automatic modes of operation have recently been replacing manual means of checkout. This has come about in particular because of the increased demands for throughput and reliability as well as because computer equipment has become increasingly complicated.

How long electronic equipment is out of operation depends largely on the time spent searching for malfunctioning elements, which is two-thirds of total down time, while outlays for preventive maintenance and repair using checkout equipment over a five-year operating period are about 10 times the intial cost of the main equipment.

Achieving high indexes of operation of computer assemblies and devices depends to a great extent on the checkout methods and means used during their development and manufacture. The task of introducing mechanized and automated checkout equipment and raising labor productivity for checkout operations arises in connection with the lag in the level and means of equipment checkout behind the level of mechanization and automation of manufacturing processes.

The experience gained has been generalized in this book and specific recommendations are made both for building and for designing specially developed checkout equipment for groups of or for individual computers to supplement that produced by industry.

This book could in no way completely cover all questions the checkout equipment developer might encounter, and the authors assume familiarity with the fundamentals of schematic drawing techniques of design, standardization, technical aesthetics, engineering psychology, etc.

The preface and chapters I, IV, V, VI, VII, VIII and IX were written by B. N. Viktorov, candidate in engineering science; chapters II and III, by B. N. Viktorov and D. D. Churabo jointly.

The authors request all comments and wishes be sent to the Izdatel'stvo "Mashinostroyeniye", 107885, Moskva, GSP-6, 1-y Basmannyy per., 3.

Contents Page

[148-8545]

8545
CSO: 1863

IMPROVEMENT OF THE PLANNING OF TRADE UNDER AUTOMATED CONTROL SYSTEM CONDITIONS

Moscow SOVERSHENSTVOVANIYE PLANIROVANIYA TORGOVLI V USLOVIYAKH ASU (Improvement of the Planning of Trade under ASU Conditions) in Russian 1979

[Annotation and table of contents from book by Anatoliy Ivanovich Grebnev and Larisa Fedorovna Shulezhko, Izdatel'stvo "Ekonomika," 12,500 copies, 126 pages]

[Text] The book examines questions of the creation of automated systems for the planning of trade and procedures for the preparation of long-range and current plans under the conditions of functionalized automated systems of planning calculations. The authors use experience accumulated in the development of the "Torgovlya" ["Trade"] subsystem of the ASPR (automated control system for planning calculations) under the Ukrainian SSR Gosplan. Described in separate chapters are methods of solving tasks in the planning of retail trade turnover, the material and equipment base of trade, distribution costs, profit and profitability, labor and wages. Ways to increase the effectiveness of planning and introducing automated systems of planning and administering trade are proposed.

The book is intended for workers of agencies for the planning and administration of trade, scientific workers and specialists engaged in the development of automated systems for the control of trade.

Contents

2174
CSO: 1863

UDC 621.372.06

METHODS OF SOLVING INTEGRAL EQUATIONS WITH COMPUTER PROGRAMS

Kiev METODY RESHENIYA INTEGRAL'NYKH UPRAVLENIY S PROGRAMMAMI DLYA EVM (Methods of Solving Integral Equations With Computer Programs) in Russian 1978 signed to press 10 Nov 77 pp 2, 289-291

[Annotation and table of contents from book by Anatoliy Fedorovich Verlan' and Valeriy Sergeyevich Snizkov, "Naukova dumka," 10,000 copies, 291 pages]

[Text] This reference work contains information about the most widespread classes of integral equations and methods of solving them. A number of practical problems from the areas of physics, mechanics, control theory and astronomy, described by integral equations and illustrating the main areas and paths of application of the given mathematical apparatus are presented. The account of most of the main methods is substantially supplemented by programs for electronic computers (33 programs in the form of operator-procedures in the ALGOL language).

Together with classical methods of solving integral equations of the second kind, methods developed only in recent years to solve equations of the first kind, relating to incorrect problems, are described. The presented methods and programs include both linear and unidimensional equations of Volterra and Fredholm and some types of nonlinear and two-dimensional equations. The material is illustrated by examples, numerical data and graphs.

The book has a practical directivity. It is designed for mathematicians, engineers of various specialties, instructors, graduate students, undergraduates and all who are engaged in the formulation and numerical solution of problems, the processing of results of experiments and the study and application of methods of computational mathematics.

Contents Page

[158/2174]

2174
CSO: 1863

UDC 62-50 : 621.3

PROCEEDINGS OF SYMPOSIUM ON THEORY OF INFORMATION SYSTEMS AND CONTROL SYSTEMS WITH DISTRIBUTED PARAMETERS

Moscow TEORIYA INFORMATSIONNYKH SISTEM I SISTEM UPRAVLENIYA S RASPREDELENNYMI PARAMETRAMI. MATERIALY VSESOYUZNOGO SIMPOZIUMA TISSURP-III, UFA, 1976 (Theory of Information Systems and Control Systems With Distributed Parameters. Materials of the Third All-Union Symposium, Ufa, 1976) in Russian 1978 signed to press 13 Sep 78 pp 2-3, 283-287

[Annotation, preface and table of contents from book edited by G. B. Gor-Petrov, V. V. Petrov, G. S. Pospelov, M. F. Zaripov and G. I. Kovalerov, Izdatel'stvo "Nauka," 1250 copies, 296 pages]

[Text] Annotation

Questions of the theory of information systems and control systems with distributed parameters for various objects are examined. The main attention is given to new ideas in the development of methods of calculating linear and nonlinear systems, generalized principles and methods of synthesis of original designs of instruments for monitoring and control and the laws of control. Also examined are new integral numerical and semi-analytical approximative methods of solving boundary-value problems for systems with distributed parameters.

The collection is intended for scientific workers, engineers, graduate students and senior undergraduate students of VUZ's.

Preface

The collection contains materials of reports presented at the Third All-Union Symposium on "Theory of Information Systems and Control Systems With Distributed Parameters," held from 29 June to 1 July 1976 at the Ufimskiy Aviation Institute. The purpose of the symposium was discussion of the contemporary state and prospects of development of the theory. All major scientific centers of the USSR were represented at the symposium.

The collection contains three sections: elements and technical means of control and regulation, information systems and control systems with distributed parameters of different physical nature (electromagnetic,

thermal, hydrodynamic and mechanical. Much attention is given to refinement of mathematical models of systems with distributed parameters, which is caused by the growth of the capacity of objects for which control systems are being developed, and also by elevation of the metrological requirements for the information systems of such objects. Refined mathematical models take into consideration the non-linearity and non-stationary character of the physical processes, boundary effects and the interconnection of processes with a different physical nature. Existing models in a number of cases do not permit calculating the indicated refined models and do not have sufficient generality. Therefore work devoted to the improvement of existing and the development of new methods of solving boundary-value problems for equations in partial derivatives and ordinary differential equations is of great interest.

Contents

2174
CSO: 1863

UDC 681.5.01.63

SYSTEMS STRUCTURAL MODELING AND AUTOMATION OF TECHNOLOGICAL PROCESS PLANNING

Unknown SISTEMNO-STRUKTURNOYE MODELIROVANIYE I AVTOMATIZATSIYA PROYEKTIROVANIYA TEKHNOLOGICHESKIKH PROTSESSOV (Systems Structural Modeling and Automation of Technological Process Planning) in Russian 1979 pp 2-6, 260-261

[Annotation, table of contents and introduction from book by V. D. Tsvetkov, Izdatel'stvo "Nauka i tekhnika," 264 pages]

[Text] The book discusses questions of the application and further development of the methodology of systems structural analysis for the construction of effective models of complex objects and processes of technological planning. The structure of the deductive theory of automation of technological planning is described, as are the starting premises and assertions made the basis of algorithms and programs of multilevel iterative synthesis of technological solutions from the block diagram of a process to steering programs for machine tools with numerical programmed control. Much attention is given to the structure of dialog algorithms, the rational distribution of functions between the technologist and the electronic computer and methods of his communication with the technical program complex of the system.

The book is intended for scientific, engineering and technical workers of machine-building and instrument-making enterprises and can be used by students and instructors of VUZ's.

Contents

Introduction

Continuous scientific and technological progress and the increase of the quantity and complexity of articles of new technology connected with that progress and curtailment of the periods of their obsolescence lead to a sharp increase of the labor intensiveness and complexity of design and technological work. The tendency, observed in recent years, toward an increase in the share of engineering labor in the total labor-intensiveness has been growing progressively recently. One of the main reasons for such a situation is lack of correspondence between the level and rates of mechanization and automation of physical labor and the labor of engineering and technical personnel.

The technological preparation of the production of new articles is characterized by great labor intensiveness and long periods required for planning work. At enterprises and in the technological design institutes from several thousands to hundreds of thousands of technological processes are worked out per year. Expenditures of time on the planning of the operating technology per part, depending on its complexity, amount to from 5-6 hours to several weeks. Still more time is required for the preparation of controlling programs for machine tools with numerical programmed control. Because of that the total time spent on working out an operating technology and the preparation of steering programs is far greater than the time required to manufacture the article.

Under these conditions the traditional methods of planning cannot assure the timely and qualitative performance of work on the technological preparation of new articles production and lead to contradiction with the requirements of scientific and technological progress. At the present time the times required and cost of technological preparation of production is possible on the basis of the creation of automated systems for technological planning [1, 2, 11, 19, 29, 30].

In recent years in various organizations of the country a large number of computer programs for the solution of various technological tasks have been developed and have undergone experimental industrial testing, tasks such

the calculation of cutting regimes and time standards, the planning of technological processes in the working of parts such as shafts, bushings, toothed wheels, parts of metal structures and reducer casings. Electronic computers are being successfully used to prepare steering programs for machine tools with numerical programmed control, the planning of operating technology for automatic lathes and the design of a shaping and complexly cutting tool [7, 9, 12, 20, 25].

On the methodological level most of the above-mentioned work was based on generalization of experience in the planning of technological processes at specific enterprises, the construction of methods of planning individual technological processes, methods of standardization and group technology and the use of methods of optimization to select rational solutions in different stabes of planning. Especially effective are programs of automation of technological planning based on the group method, as in that case progressive technological processes and rapidly readjustable equipment are taken as a basis. Experience shows that such an approach has well justified itself in the automation of the planning of processes in the working of parts with a typical configuration [18].

The further development of work on automation of the planning of technological processes in the working of more complex parts has encountered serious difficulties, primarily connected with inadequate development of the theory of planning technological processes suitable for the mathematical modeling and algorithmization of planning processes. Up to now in technological science analytical and logical relationships linking the parameters of a part to be worked with the structure and characteristics of the technological process and equipment for its manufacture have not yet been found.

In machine-building technology special attention has been given to tasks in the analysis of technological processes in order to determine the influence of various factors factors on the precision, productivity and economic effectiveness of the working of parts [13, 15, 25, 26, 37]. At the same time, there has been inadequate investigation of methods of synthesis of technological processes on the basis of characteristics of the part to be worked and the production system of the enterprise under the conditions of which the planned technological process must be carried out. The creation of a theory of planning assumes a transition from traditional tasks of analysis and empirical classifications to problematics of tasks in the synthesis of technological processes [3].

The difficulty in the solution of those tasks within the framework of traditional approaches consists in the great complexity and variety of planning problems and its irreducibility to a group of separate, but important, calculating and analytical tasks. Planning emerges as a complex problem in which tasks of synthesis, modeling, analysis, estimation, optimization and selection of alternatives are interwoven in a complex interconnection. Use of the methodology of the systems approach is necessary for the solution of such complex tasks.

The systems approach starts from the fact that the specifics of complex objects and processes are not exhausted by distinctive features of the parts and elements composing it but consists in the character of the connections and relations between them. Expansion of the starting base by the introduction of such concepts as structure, function, organization, connection, relation, etc, assures definite advantages of the systems approach over traditional methods of investigation and permits creating models of complex objects, technological processes and planning processes more adequate for reality.

In connection with that the task of our work is to develop methods of systems structural modeling of objects and processes of planning and the construction of the principles of a theory of automated technological planning and an algorithmic complex corresponding to that theory. The book has the following structure.

In the first chapter the systems character of complex objects of technological processes and processes of planning is substantiated. A methodology of systems structural analysis is developed with respect to indicated objects and general mathematical models of objects and processes as technical systems are constructed. The structure of the systems theory of automated planning is examined.

The multilevel iterative method of automated technological planning is described in the second chapter. The types and composition of planning operations are substantiated and their characteristics and a model of the interation are presented.

The third chapter contains a description of systems mathematical models of parts to be worked and the formalized technological language of an automated system of planning created on the basis of them.

The following three chapters are devoted to technological mechanisms of the synthesis of block diagrams of a technological process, the flow route of processing, operating technology and steering programs for machine tools with numerical programmed control. Formulated in the last chapter are the principles of construction of integrated systems of technological planning, which determine the conditions of effective functioning of a system in the composition of an enterprise and its rational division into subsystems. On the basis of the formulated principles and statements a structure of the system has been worked out in the form of a group of three models mutually supplementing one another: the hierarchic, informational and logical-functional.

The scientific positions and the systems of automated technological planning constructed on the basis of them have undergone industrial testing and have been introduced at various machine-building enterprises.
[0484/2174]

END

2174
CSO: 8044/0484