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16 June 1980

USSR Report

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

(FOUO 8/80)

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DEVELOPMENT AND PRODUCTION OF COMPUTERS
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HARDWARE

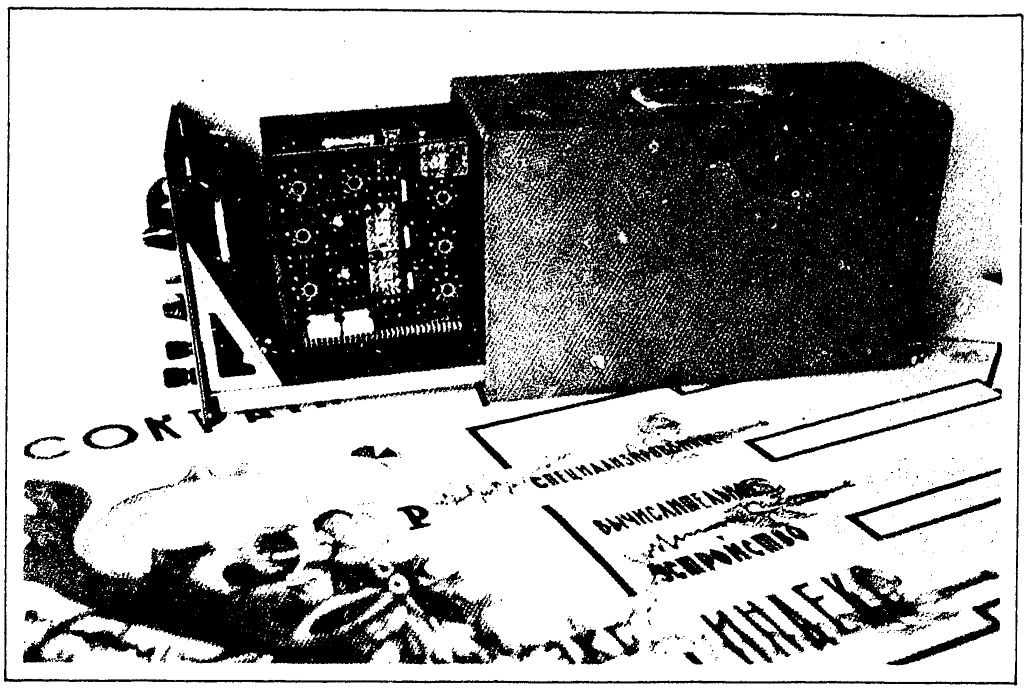

PHOTO OF "INDEKS" SPECIALIZED COMPUTER

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 inside front cover

The "Indeks" specialized computer is designed for automatic continuous beat-by-beat calculation of the heart contractibility indexes under experimental and clinical conditions. Automation of the calculation of the most complete functional set of indexes of the operation of the heart has been realized for the first time in the world. The "Indeks" specialized computer is an analog computer executed from Soviet integrated operation amplifiers. The instrument has undergone long-term laboratory and clinical testing. The application of the "Indeks" specialized computer insures high economic indexes and improves the diagnosis of the condition of the myocardium.

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OPTIMAL CONTROL ALGORITHM FOR THE UP-TIME PROCESS WITH LIMITED USE OF INFORMATION STORAGE

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 81-85
manuscript received 5 Jun 79

[Article by G. L. Brodetskiy]

[Excerpts] When investigating complex systems by means of problem-oriented computers and simulating complexes, high requirements are imposed on their output capacity. Accordingly, it is of interest to investigate the models of optimal organization of the computer process maximizing the output capacity of the system. In [1], the output capacity of the system was simulated in the presence of two types of failures: those that destroy the information and those that do not destroy it. In a number of papers, for example [2-4], it is demonstrated that the efficiency of the use of the resources of such systems can be raised by utilizing the introduction of time redundancy namely, as a result of developing a model of the optimal organization of the storage of the intermediate results. It was proposed that the information storage can be organized at any point in time of the execution of the problem.

In this article a model is proposed for the optimal organization of the storage of the intermediate results, maximizing the output capacity of the system in the case where the possibility of storing the information in the initial and final stages of execution of the problem is excluded. In particular, such a situation occurs when executing the problem on a computer, when the information storage can be unacceptable as a result of the performance of input-output operations in the indicated intervals, the formation of the data files, and so on.

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PROBLEMS OF CONSTRUCTING THE ADAPTIVE STRUCTURES OF COMPUTERS USING MULTIFUNCTIONAL AUTOMATA AND ALL-PURPOSE LOGICAL ELEMENTS

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 34-39
manuscript received 27 Apr 79

[Article by V. A. Mishchenko, V. D. Kozyuminskiy, A. N. Semashko]

[Excerpts] The improvement of computer efficiency by paralleling the calculations has led to the appearance of reorganized computer structures permitting structural paralleling of the program. The redistribution of the computer resources is organized in such a structure as a function of the solved problem by the criterion of achieving maximum efficiency.

The most efficient from the point of view of functional possibilities and possibilities with respect to adaptation to the solved problems is the structure containing the single-type multifunctional adaptable data processing automata with a developed network of controllable relations (uniform media); the controllable relations can be organized by means of special commutation automata. In such a medium the paralleling of the problem is organized by the criterion of achieving maximum algorithmic speed. In the multifunctional processing automata themselves it is possible to use the principle of maximum structural speed where the information conversion time is determined only by the depth of the structural layout of the processing automaton. The combination of the maximum algorithmic and structural speeds will permit the construction of highly efficient computer networks. The basic functional cell of such a computer network is the multifunctional automaton -- the multifunctional processor -- which can have a highly complex structure. A study is made below of the general problems of constructing multifunctional automata for the adaptive structures of computers based on the all-purpose logical elements and also certain problems in the synthesis of all-purpose and multifunctional logical elements.

In conclusion, it is necessary to note that the application of the MFA [multifunctional automaton] along with the construction of adaptive computer structures also provides for the solution of such highly important problems as shortening the nomenclature of their element base. The broad functional possibilities of such an element base and its limited nomenclature with a high degree of integration should provide advantages over the existing microprocessors characterized by a number of deficiencies:

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Each microprocessor is oriented to the structure of a computer of defined architecture and characteristics which is one of the causes for the broad nomenclature of microprocesses;

As a rule the microprocessor contains, in addition to the microprocessor itself, other microcircuits, the number of which in one unit can reach several tens of types; at the same time the application of the microprocessors does not solve the problem of reducing the nomenclature of the element base of the computer, especially a high-output computer;

The principles of the structural organization of the existing microprocessors do not permit achievement of high data processing efficiency with traditional organization of the computer.

The noted deficiencies of the microprocessors are limiting their application at the present time for the construction of high-output computer systems. The use of the multifunctional principle when developing the element base of computers and solving the problem of increasing their speed will make it possible to eliminate the basic deficiencies of the existing microprocessors.

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APPLICATION OF ALGORITHM FLOWCHARTS WHEN DESIGNING CONTROL SYSTEMS BASED ON MICROPROCESSORS

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 93-98
manuscript received 20 Apr 79

[Article by V. M. Skidanov]

[Excerpts] At the present time the problems of the further development and improvement of the procedure for synthesizing microprocessor systems are highly urgent. They are the subject of an investigation of this article.

The simplification of the algorithm to which the application of the flowcharts leads permits simplification of the program for the microprocessor, which, as a result, reduces the size of the permanent memory occupied by the program and the program execution time. The latter has especially important significance when the microprocess operates in real time, in particular, in a control system. The operating program of the microprocessor, which corresponds to an algorithm in Figure 3, is presented in Table 2 (the K580-IK1 microprocessor instruction system was used).

With an increase in the number of states (to tens and hundreds), the design of the control system by using graphs and the methods of minimizing them will in practice become inexpedient. In this case the method substantiated in this article can be used, for the application of the algorithm flowcharts, in addition to everything that has been stated, makes it possible to obtain formalization that is convenient for the machine design of digital control systems.

Bibliography

1. M. D. Khvostantsev, "Microprocessors and Data Processing Systems," ZAPUZHNAYA RADIOELEKTRONIKA (Foreign Radioelectronics), No 9, 1975, pp 31-60.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

2. Ven Ch. Lin', "Fundamentals of the Design of Digital Systems Based on a Microprocessor," MIKROPROTSESSORNYY UCHEBNO-OTLADOCHNYY STEND (Microprocessor Training and Debugging Unit), TIIER, Vol 65, No 8, 1977, pp 41-66.

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[263-10845]

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CSO: 1863

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PROCEDURE FOR DETERMINING THE BASIC PARAMETERS OF A SPECIALIZED DIGITAL COMPUTER IN THE SYSTEMS DESIGN STEP

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 25-28
manuscript received 1 Mar 79

[Article by A. M. Belentsev, V. F. Guzik, A. I. Interskiy]

[Excerpts] At the present time the most complicated step in the process of building specialized digital computers is the systems design steps. This arises from difficulties occurring in formalizing the description of the process of designing a specialized digital computer by means of a general-purpose digital computer.

The purpose of this article is to develop a procedure for defining the basic parameters of a specialized digital computer:

The optimal system of instructions;

The optimal technical characteristics of the specialized digital computer.

Bibliography

3. A. D. Aleksandrov, A. M. Belevtsev, "An Algorithm for Defining the Basic Parameters of the Specialized Digital Computer in the Disign Phase," TEZ. VSESOYUZN. NAUCHNO-TEKHN. KONF. POVYSHENIYE EFFEKTIVNOSTI I KACHESTVA PRODUKTSII NA BAZE RAZVITIYA RASPREDELENNYKH SISTEM UPRAVLENIYA I PRIMENENIYA MIKROPROTSESSORNYKH USTROYSTV (Topics of the All-Union Scientific and Technical Conference on Improving the Efficiency and Quality of Production on the Basis of Developing Distributed Control Systems and the Application of Microprocessors), Moscow, 1978, pp 12-13.

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PROBLEM OF AUTOMATING SET-UP ON ANALOG COMPUTERS

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 77-80
manuscript received 10 Nov 79

[Article by V. N. Gugnin, V. I. Kalashnikov, V. I. Kovalev]

[Excerpts] A discussion is presented of the approach to the solution of a number of problems connected with the creation of an automatic analog processor (AAP), and some information is presented on the results of performing the operations of raising the level of automation of the analog part of hybrid computer systems.

By AAP we mean an all-purpose analog computer, the access process of which is facilitated to the maximum for the user, including all steps in the solution of a problem on the analog computer: from programming the initial mathematical description to obtaining the required solution. Such an AAP is considered a special case of the combination of analog and digital computers within the framework of a unified computing process to solve the problems of programming, set-up, monitoring and diagnosis of analog computers using digital computers.

It is expedient to take the AAP as an independent computer means capable of performing its own functions both in an automatic programming system and in the manual programming mode. Considering the satisfaction of this condition, a set of programs [1] has been developed not only with respect to input of the initial texts of the mathematical description of the problems in a special language from the keyboard or punchtape, but also a set of programs for printout, punchtape output or output of the text of the problem to the communication channel with the AAP after translation in the internal AAP language.

The most urgent and least resolved problems are the problems of creating a system for automatic set-up of the structural circuitry of the solvers (RB). Their solution increases the efficiency of the hybrid systems. The basic cause of the lag in this area has been the absence of switching devices which satisfy the requirements of analog signal transmission.

The switching element used as the basis for the automatic set-up system must provide for ranges of variation of the commuted occurance in voltages

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within the limits of 10^{-12} to 10^{-1} amps and 10^{-6} to 10^{2} volts, resistances of the closed-open states of 10^{-2} and 10^{11} ohms, respectively, a transfer capacitance of less than 10^{-12} farads, a wiring capacitance of about 10^{-11} farads. At the same time, in view of the significant capacitance of the commutation bank, the requirements of compactness, economicalness, technological nature and the possibility of using simple coupling circuits with the element base of the digital computer are imposed on the commutators which constitute the local set of commutation elements. These requirements had to be satisfied when creating the original matrix commutators [9] using sealed magnetically controlled contacts (gercons) as the commutation elements. It is proposed that all the of the slow commutations be performed in the AAP on the basis of the developed matrix commutators: setting up the parameters of the problems, the operating modes of the analog computer, the set-up in the nonlinear modules and, the main thing, coupling the solvers.

When creating an automated system for setting up problems in the AAP, the approach taking into account a compromise between the hardware and software and also the type of switches used is recognized as best. Here we were guided by the following requirements on the commutation system:

The commutation system must obtain a minimum number of commutation elements;

A minimum number of switches must provide access to setting the relations similar to the capabilities of the manual plugboard;

The commutation structure must permit buildup of the commutated modules with minimum increase in the number of additional commutational elements.

Using the approach to organizing the commutation section and creation of the control circuit for the automatic plugboard described in [5, 8], an automatic plugboard was developed for the medium class analog computer having 64 solving amplifiers (32 integrators and 32 adders) distributed uniformly among four groups of four modules each. Each module includes two three-input integrators and adders and eight constant coefficient modules. This set-up of the module solvers permits the realization of different structural layouts of the set-up of second order equations with the possibility of breakdown and buildup. When solving higher order equations, the solvers of several modules are used, correspondingly.

The results obtained in the given phase provide a basis for considering the selected approach to the creation of automatic plugboards and AAP as a whole prospective. The further development of this area will make it possible for the user to have the highly efficient hybrid computer system at his disposal in the near future.

Bibliography

1. I.V.I Kalashnikov, S. A. Shamov, V. N. Usova, T. K. Matviyenko, "Automated Programming System for Analog Computers," V VSESOYUZNAYA NAUCHNO-TEKHNICHESKAYA KONFERENTSIYA DAL'NEYSHEYE RAZVITIYE ANALOGOVOY I ANALOGO-TSIFROVOY VYCHISLITEL"NOY TEKHNIKI: TEZ. DOKLADOV (5th All-Union

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

Scientific and Technical Conference on the Further Development of Analog and Analog-Digital Computer Engineering. Topics of Reports), Moscow, NTORES im A. S. Popova, 1977, pp 30-31.

3. A. G. Murashko, N. I. Senchenko, M. F. Terent'yev, "Principles of Constructing an Automatic Commutation System for the Operation Elements in a Resolving Structure," ANALOGOVAYA I ANALOGO-TSIFROVAYA VYCHISLITEL'NAYA TEKHNIKA (Analog and Analog-Digital Computer Engineering), No 6, 1973, pp 109-114.

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CSO: 1863

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

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APPLICATION OF MATRIX COMPUTERS FOR CODING/DECODING THE BCH CODES

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 66-72
manuscript received 4 Jun 79

[Article by V. B. Smolov, L. A. Shumilov, L. A. Zaykova]

[Excerpts] The Bose-Choudhuri-Hoquinham (BCH) algebraic cyclic binary codes form the best structural codes among those known for channels in which errors in the series symbols occur independently [1, 2]. Their powerful correcting capacity is combined with relatively simple decoding algorithms. A study is made of the BCH binary codes for communications channels without erasure.

The matrix computers for performing operations on polynomials and elements of finite fields GF(2^m) permit a defined speed to be reached when performing the indicated operations, and the uniformity of the structure makes them prospective for execution in the form of large integrated systems. The given devices can be used when constructing specialized coding/decoding devices and also as functional expanders when creating these program units on the basis of microcomputers.

Let us consider the operations of coding/decoding information by the BCH code, and let us estimate the required hardware and time expenditures in the case of using the matrix computers.

The presented time and hardware expenditures when using matrix computers in each phase of coding/decoding the BCH codes permit estimation of the complexity of the coding/decoding devices and the composition of the functional expanders for microcomputers and also determination of the speed of execution of the indicated operations.

Bibliography

3. Raychev, Radoslav Petkov, "Investigation of the Problems of Executing Coding and Decoding Devices on the Basis of Microprocessors for Codes with High Correcting Capacity," Author's Review of Dissertation for the Scientific Degree of Candidate of Technical Sciences, Leningrad, 1979.

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[263-10845]

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

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PRINCIPLES OF CONSTRUCTING SPECIALIZED COMPUTER STRUCTURES FOR AUTOMATED SOLUTION OF THE INVERSE PROBLEMS OF THERMAL CONDUCTIVITY

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 73-77
manuscript received 9 Aug 79

[Article by Yu. M. Matsevityy, S. F. Lushpenko]

[Excerpts] In connection with the difficulties of physical experimentation and the limited possibilities of the analytical methods when investigating the heat exchange phenomena the numerical methods implemented on digital, analog or hybrid computers have begun to acquire more and more significance. This pertains fully to the solution of the inverse problem of thermal conductivity in which the extreme (boundary and initial) conditions of heat exchange, the thermophysical properties of the material of the object are defined by the limited information on the temperature field of the object or the mathematical model of the phenomenon itself is more precisely defined.

The numerical methods of mathematical simulation of the thermal processes on analog devices, as is known, permits the solution of highly complicated (three dimensional, nonlinear, nonstationary) problems of thermal conductivity. The application of these methods for the solution of the inverse problems removes many of the restrictions on the conditions of performing the physical experiment imposed by the analytical methods. They offer the possibility of using the results of the general heat engineering experiments to determine the thermophysical characteristics of the material instead of the specialized experiments as many other methods require.

This article discusses the analogous methods and means of solving the inverse problems differing from the known approaches of the application of electric models for identification of the thermophysical properties.

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DEVELOPMENT AND PRODUCTION OF COMPUTERS
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COMMUNICATION AND DATA PROCESSING LANGUAGE OF THE KOD INFORMATION SYSTEM

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 pp 28-34
manuscript received 23 Mar 79

[Article by B. V. Ignatenko, V. I. Pavlovskiy, K. G. Samofalov]

[Excerpts] When developing general-purpose information systems, the problem of automating the programming of the applied data processing problems, expanding the class of users to include people not having professional programming skills, is one of the most urgent problems.

The communication and data processing language (YaKOD) proposed in this article belongs to the class of data manipulation languages in relational data bases. It is designed to represent the user requests for retrieval, extraction and conversion of data. The YaKOD language is part of the data language of the communication and data processing information system (ISKOD) designed to integrate the data in a unified data base and provide effective access to the data base on the part of the user who does not have special training in programming.

The architecture of the ISKOD is presented in the figure. In this system the data model is based on the relational model, and the control of the data base is realized by means of developed high-level language media not requiring special training of the user in programming.

The data model for the user is expressed in the form of the logical structure of the data which permits the user to work with structures corresponding to the natural (and not defined in the process of construction of the model) relations between the data, which greatly simplifies the description of the manipulation of the data. The description of the model, that is, the axiomatics (definition) of the data permitted by the model is represented in the form of a data circuit in the system. The data base is controlled by means of the data language which is a set of independent sublanguages oriented toward performing individual data base control functions: definition, representation (initialization), communication and processing of the data.

The system user is either the applied program or a person who controls the data using the language media. The user assignments are processed by the data manipulation and initialization processors. The user assignment is

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carried out on the basis of the structure, the model and the schematic of the user data.

When controlling the data base in the system memory a space is allocated which is called the operating field. It is used for reception and transmission of the processed data.

The procedure of separate storage of the data and the relations [2] which permits multiaspect retrieval and random processing of the data, is selected for the physical structure of the data.

When formulating the refences to the data base in YaKOD language, in contrast to the languages such as SEQUEL, YaMD SIZIF [1, 5-7, 13, 14], in the general case the user is relieved of the necessity for identifying the names of the relations to the data of which reference is made in the statements of the language. This is achieved as a result of the fact that in the ISKOD data model, the interrelations are described not only between the elements inside the relation, but also between the elements of different relations. For example, in the investigated data base the interrelation is described between the SUPPLIER and the ENTERPRISE elements, which is expressed in the fact that the values of the SUPPLIER element are a subset of the values of the ENTERPRISE element. However, if certain interrelations have not been established in the data base, then the user is granted the possibility of defining them directly in the statements of the language for the purposes of the formulated assignment.

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COMPLEX OF PROGRAMS FOR NUMERICAL MODELING OF TSUNAMIS

Novosibirsk MODUL'NYY ANALIZ in Russian signed to press 25 Dec 78 pp 73-74

[Excerpt from article by Yu. I. Shokin, L. B. Chubarov, V. K. Gusyakov, Z. I. Fedotova and An. G. Marchuk from collection of articles edited by Yu. I. Shokin, Institute of Theoretical and Applied Mechanics, Siberian Department, USSR Academy of Sciences, Novosibirsk, 1978, 500 copies 114 plus pages]

[Excerpt] By now in the Institute of Theoretical and Applied Mechanics and the Computer Center of the Siberian Department, USSR Academy of Sciences, some experience has been accumulated in the creation and realization of algorithms modeling various stages in the life of a tsunami wave. The extensive program for mastering the Pacific Ocean coast of the USSR makes it necessary to create computing models and programming for detailed tsunami regionalization of that region. Such a task can be solved only with the use of contemporary means of numerical analysis, computer hardware and computer software. For that purpose a possible structure of a complex of programs is proposed in the present work and an attempt is made to formulate the basic requirements for separate parts of the complex.

Examples are presented of calculations made according to functioning programs.

The works of S. L. Solov'yev [15], A. N. Konovalov and N. N. Yanenko [10], V. Ya. Karpov, D. A. Koryagin and A. A. Samarskiy [9] have had a great influence on the contents of the present investigation.

The author's results on tsunami calculation have been presented in [1, 4-6, 17-21].

1. The physical constants of problems, mathematical models and numerical algorithms

The following stages are ordinarily distinguished in the general picture of the development of tsunami waves:

1. Generation;
2. Propagation over the depth of the ocean;

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3. Propagation over ocean of small depth;

4. Propagation in the shelf zone;

5. Emergence on a coast, destruction of the wave.

In each of those stages a leading role is played by various physical factors, which leads to a need to use different mathematical models to describe the wave behavior.

1.1. Generation of a tsunami wave

The source of most tsunami is large submarine earthquakes that lead to the displacement of the sea bottom on large areas, which in turn causes oscillations of the covering water layer. During propagation in the open ocean the tsunami waves have a small amplitude (1-3 m), a large period (15-20 min) and a high velocity (up to 700 km/hr). As a result of the fact that the entire thickness of the ocean in drawn into motion, tsunami waves have a considerable energy and at times produce a destructive effect on a coast.

Two methods of modelling the process of tsunami generation will be examined here: elasto-seismic and hydrodynamic.

Participating in work on the described complex of programs is a collective consisting of specialists in numerical analysis, seismology and applied programming. The basic computer is the BESM-6 electronic computer, in sets with magnetic disk or magnetic tape devices. In addition, the presence of the BENSON plotter, working autonomously, is proposed. The basic language is the high-level algorithmic language FORTRAN and the autocode MADLEN, working within the DUBNA monitoring system. Used for the exchange of data with external carriers (magnetic disks and tapes) is an operator system [3], and let us note at once that this system gives the greatest effect during work with stores on magnetic disks. The information is processed graphically by means of the SMOG system [12,13].

Conclusion

It must be noted that the area of application of the complex of programs described in the present article is not limited to numerical modeling of tsunamis. After slight editing it can be used successfully to calculate wave movements in riverbeds, high waters, oscillations in inland waters, etc.

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Field of Data

Bathymetry

Seismic data

Tidal data

Characteristics of land relief

Rougness characteristics of ocean bottom

Characteristics of model tsunamis

Program of Initial Geophysical Data Processing

Programs for Calculation of Tsunami Wave Generation

hydrodynamic model

elasto-seismic model

Programs for Calculation of Tsunami Wave Distribution

PHYSICAL CHARACTERISTICS OF TASK TO BE SOLVED

deep ocean

shallow ocean

shelf zone

ice cover

MATHEMATICAL MODELS

linear equations of shallow water

non-linear equations of shallow water

equations of the Boussinesk type

Programs for Calculation of the Advance of Waves on a Coast

approximate hydrodynamic models

complete hydrodynamic model; Navier-Stokes equations

Field of Results

Processed bathymetry files

Theoretical tide gauges at given points on coast

Wave fields

Tables of arrival times of head waves

Energy characteristics

Zones and characteristics of flooding

Figure 1

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The series of figures 2-13 illustrates the possibility of the above-mentioned set of service subroutines.

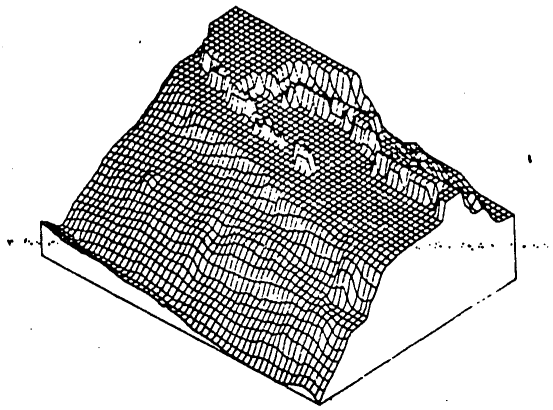

Fig 2. Image of the relief of the calculated region.

Fig 3. Depth isolines of the calculated region.

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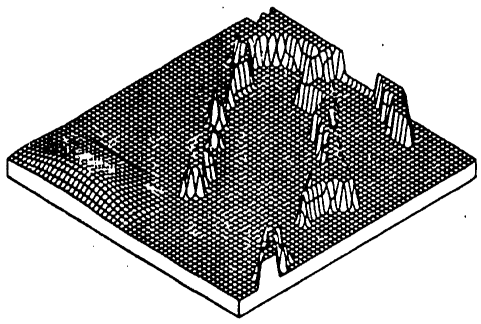

Fig 4. Initial distribution of wave heights, obtained by means of an elasto-seismic model.

BIBLIOGRAPHY

1. Alekseyev, A. S., Gusyakov, V. K., Chubarov, L. B., and Shokin, Yu. I. Numerical investigation of tsunami generation and propagation on a real bottom topography. Linear model. In collection: Izucheniye tsunami v otkrytom okeane (Study of Tsunamis in the Open Ocean), Nauka, Moscow, 1978.

2. Andryushchenko, N. V., Vannykh, V. I., and Legon'kova, G. S. Questions of the economization of large programs created on the basis of the DUBNA monitor system. In collection: Chislennyye metody mekhaniki sploshnoy sredy (Numerical Methods of Continuum Mechanics), Izd-vo Computer Center and Institute of Theoretical and Applied Mechanics, Siberian Department, USSR Academy of Sciences, Vol 8, No 3, 1977.

3. Veretenov, B. Yu. Work with an external memory (tapes or drums) as devices of direct access to the DUBNA monitoring system. IAE, Informator No 5, 2430, Moscow, 1974.

4. Gusyakov, V. K. Excitation of tsunami waves and Rayleigh oceanic waves during a submarine earthquake. In collection: Matematicheskiye problemy geofiziki (Mathematical Problems of Geophysics), No 3, Izd-vo Computer Center, Siberian Department, USSR Academy of Sciences, 1972.

5. Gusyakov, V. K. The connection of tsunami waves with the parameters of the focus of a submarine earthquake. In collection: Ibid, No 5, Part 1, 1974.

6. Gusyakov, V. K. Residual displacements on the surface of an elastic half-space. In collection: Uslovno-korrektnyye zadachi matematicheskoy fiziki v interpretatsii geofizicheskikh nablyudeniy

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

(Conventionally Correct Problems of Mathematical Physics in the Interpretation of Geophysical Observations). Izd-vo VTs SO AN SSSR (Computer Center, Siberian Department, USSR Academy of Sciences) 1978.

7. Dorfman, A. A., and Yagovdik, G. I. Equations of an approximate nonlinear dispersed theory of long gravitational waves excited by displacements of the bottom and propagating in a basin of variable depth. In collection: Chislennaya metody mekhaniki sploshnoy sredy. Izd-vo VTs SO AN SSSR, 1978.

8. Ivanov, V. F., and Cherkesov, L. V. On Corteweg-de Vries equations in long-wave theory. MGI, No 1, 1974.

9. Karpov, V. Ya., Koryagin, D. A., and Samarskiy, A. A. Principles of the development of packages of applied programs for problems of mathematical physics. ZhVM i MF, Vol 18, No 2, 1978.

10. Konovalov, A. N., and Yanenko, N. N. The modular principle of construction of programs as the basis for the creation of a package of applied programs for the solution of tasks of continuum mechanics. In collection: Kompleksy programm matematicheskoy fiziki (Complexes of Programs of Mathematical Physics). Izd-vo VTs SO AN SSSR,1972.

11. Lyatkher, V. M., and Militeyev, A. N. Calculation of the rolling of long gravitational waves on a slope. OKEANOLOGIYA, No 1, 1974.

12. Matematicheskoye obespecheniye grafopostroiteley. I uroven' (Plotter Software. Level I). Yu. A. Kuznetsov, editor. Izd-vo VTs SO AN SSSR, Novosibirsk, 1976.

13. Matematicheskoye obespecheniye grafopostroiteley. II uroven' (Plotter Software. Level II). Yu. A. Kutznetsov, editor. Izd-vo VTs SO SSSR, Novosibirsk, 1976.

14. Nekrasov, A. V. Reflection of tidal waves from the shelf zone. OKEANOLOGIYA, No 2, 1972.

15. Solov'yev, S. L. The problem of tsunamis and its significance for Kamchatka and the Kuriles Islands. In collection: Problema tsunami (The Problem of Tsunamis), Nauka, Moscow, 1968.

16. Sudobicher, V. G., and Shugrin, S. N. Movement of waves along a dry riverbed. IZVESTIYA SO AN SSSR, SERIYA TEKHNICHESKIKH NAUK, No 3, 1968.

17. Fedotova, Z. I. On the application of an invariant difference circuit for calculation of oscillations of liquid in a basin. In collection: Chislennyye metody mekhaniki sploshnoy sredy, Vol 9, No 3, Izd-vo VTs SO AN SSSR and ITPM SO AN SSSR, Novosibirsk, 1978.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

18. Chubarov, L. B. On some numerical models of the propagation of long waves in a liquid with an ice cover. In collection: Chislennyy analiz (Numerical Analysis). Izd-vo ITPM SO AN SSSR, Novosibirsk, 1978.

19. Chubarov, L. B. The MKUR complex of programs for calcuation of long wave propagation within the frameworks of linear and nonlinear models of shallow water. GFAP, Report No P003015, SBORNIK ALGORITMOV I PROGRAMM, No 4, 1978.

20. Shokin, Yu. I., and Chubarov, L. B. Numerical modelling of tsunami propagation. In the collection: Chislennyy analiz. Izd-vo IPTM SO AN SSSR, Novosibirsk, 1978.

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LIST OF SOVIET ARTICLES DEALING WITH ALGORITHMS AND PROGRAMS

Moscow ALGORITHM I PROGRAMMY. BIBLIOGRAFICHESKAYA INFORMATSIYA. Issue 3, 1980 signed to press 10 Mar 80, Items 743, 852, 862, 863, 869, 880, 1022, 1026, 1030, 1033, 1038, 1043, 1131.

[Following is a listing of Soviet entries from ALGORITMY I PROGRAMMY. BIBLIOGRAFICHESKAYA INFORMATSIYA (ALGORITHMS AND PROGRAMS. BIBLIOGRAPHICAL INFORMATION), a bibliographic publication of GOSUDARSTVENNAYA PUBLICHNAYA NAUCHNO TEKHNICHESKAYA BIBLIOTEKA SSSR. This listing is from Issue 3, 190, items 739-1131]

[Excerpts]

743. Golenkov, Ye. A., Popov, B. G., and Pomatilov, A. N., "Development of Software for Minicomputers," Preprint, Vladivostok, 1979, 15 pp, Academy of Sciences USSR, Far Eastern Science Center, Institute of Automation and Control Processes.

Methods and means of increasing the labor productivity of programmers who are developing large and complex software systems for minicomputers. The DISOTL system to prepare programs for minicomputers using large YeS computers is described.

852. Vasil'yeva, L. S., and Lebedeva, A. V., "Study of the Characteristics of a Data Exchange Algorithm Using the AFTN Format," "Inter-VUZ Thematic Anthology of Scientific Works," Moscow Institute of Civil Aviation Engineering, 1979, vyp 4, "Effectiveness and Optimization of Systems and Processes in Civil Aviation," pp 195-206, four bibliographic entries.

Determination of the probability of erroneous decoding and the relative speed of transmission by the method of analytic evaluation and modeling in FORTRAN. Combinations of KOI-7 code were used as control and service signals. The transmission technique was the semiduplex method with feedback and latency. Modeling time was seven minutes.

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862. Antoshuk, L. F., and Klimachev, S. N., "The Use of Machine Design Techniques to Calculate Continuous Control Systems," in "Upravleniye Tekhnicheskimi i Organizatsionnymi Sistemami s Primeneniyem Vychislitel'noy Tekhniki" [Control of Technical and Organizational Systems Using Computers], Academy of Sciences USSR, Institute of Control Problems, Moscow, 1979, pp 9-14, two bibliographic entries.

The RADIUS (Calculation of Dynamic Control Systems) system is described. FORTRAN is used as the base language. The assignment control language and input language of the system are described.

863. Bagiyev, E. S., and Zozulevich, D. M., "Comprehensive Design Automation and Printed Plate Fabricating System," TEKHNIKA SREDSTV SVYAZI. SER. RADIOIZMER. TEKHNIKA 1979, Vyp 5(23), pp 77-84, four bibliographic entries.

Characteristics of the organization and interaction of the subsystems of the comprehensive automated design and printed plate fabricating system. The software is described in Assembler and FORTRAN-4 languages; for the first phase of the system it has a capacity of 300 kilobytes.

869. Konopkin, V. N., "The Application of Formula Description Language to Output Machine Documents," Report at the Fourth Conference of Young Specialists and Scientists, April 1978, Moscow, 1979, 11 pp (Preprint/ Academy of Sciences USSR, Institute of Precision Machines and Computer Technology, No 10).

A description language for basic logical elements to describe logical circuits. The description carries the imprint of the element base, but allows writing in a line. The program package was written in FORTRAN. The programs contain 2,500 statements.

880. Shepin, Yu. N., Ostrovskiy, V. I., and Molchanova, L. P., "Solving Problems of Optimal Arrangement of Checkpoints in the Industrial Process of Making Hybrid Large-Scale Integrated Circuits," ELEKTRON. TEKHNIKA. Ser. 10 MIKROELEKTRON. USTROYSTVA 1979, vyp 2(14), pp 82-87, three bibliographic entries.

The problem of optimal arrangement of checkpoints in a sequential industrial process of multilayered spreading of thin-film hybrid large-scale integrated circuits based on polymide film using the criterion of reducing the average cost of a usable microcircuit. Two algorithms in FORTRAN are developed. Solution time for the second algorithm is ~4 seconds; for the first it is ~100 minutes.

1022. "Base Software of ARM [Automated Work Place]. Version 1.1.T.4. Auxiliary Programs. Book 4. Dialog Graphic Program for Forming and Editing DIAGRAF Images. Description and Operating Manual," 264.072.089 IE10/Institute of Electronic Controlling Machines, B.m. 1979, 29 pp.

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APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

1026. "M-400 Software. DOS-400 Disk Operations System; Instructions on System Generation," 264.072.053 IE1/Institute of Electronic Controlling Machines," B.m., 1979, 94 pp.

The information necessary to install and control the DOS-400 system. The manual covers the DOS-400 set and terminology used; procedures for installing the monitor and system programs, obtaining working copies of the system, and regenerating the system; description of procedures for modification of the monitor and system configuration module; possibility of adding, replacing, and removing drivers and EMT modules; additional capabilities of the program to control files on system and non-system disks. A test of the SYSTEM-MAC module is given.

1030. Skryabin, V. G., "Automation of Constuction of Flowcharts of Autocoding Programs. Structural Debugging of Programs According to Their Flowcharts," ELEKTRON. TEKHNIKA. SER. 10. MIKROELEKTRON. USTROYSTVA 1979, vyp 5(17), pp 75-78, five bibliographic entries.

The system for constructing flowcharts on the basis of the command structure and grammar of a particular autocode of the MAKROBEMSh IPM language. The method of using these flowcharts in the debugging cycle is described.

1033. Belov, S. B., "Organization of Dynamic Loading of Programs in the YeS Operations System," Preprint, Vladivostok, 1979, 17 pp with illustrations, Academy of Sciences USSR, Far Eastern Science Center, Institute of Automation and Control Processes, three bibliographic entries.

A general-purpose tabular control system of dynamic loading for any program system in FORTRAN, developed to serve the DISGRAF multiterminal interactive graphic system with a 25-30 percent reduction in memory. Main memory volume is about six kilobytes.

1038. "The Uniform System of Electronic Computers. Operations System. SEREP Independent Program for Editing and Printing Information on Errors. Operator's Manual," Ts51.804.004 D73, B.m., 1979, 19 pp.

1043. Karasin, B. Ya., "Interlinking Program Modules in PL/1 and FORTRAN-4 in the YeS Disk Operations System," MO EVM/Academy of Sciences Belorussian SSR, Institute of Mathematics, NIIEVM, 1979, vyp 20, pp 32-36.

A program module using Assembler language is described, which assures coupling of the program mediums in which the modules function, obtained by translators with languages PL/1 and FORTRAN-4. A subprogram using FORTRAN can only be set up and type SUBROUTINE.

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1131. Petrukhin, V. P., "Optimization of Arrangement When Designing Large-Scale Integrated Circuits on the Basis of a Library Set of Elements," ELEKTRON. TEKHNIKA. SER. 10. MIKROELEKTRON USTROYSTVA 1978, vyp 4(10), pp 70-76, three bibliographic entries.

The algorithms are realized in the form of a set of programs in FORTRAN-4 and Assembler. The programs have a total volume of about 3,000 statements. Main memory volume is 256K or more. Constraints on the dimensions of the circuits being designed: number of elements being arranged -- 100 or less; number of assemblies in list of networks -- 10,000; number of networks -- 3,000.

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OPERATIONAL MEANS ASSURING THE FUNCTIONING OF THE BESM-6 COMPUTER WITH A STANDARDIZED MAIN-LINE EXCHANGE SYSTEM (UMSO)

Novosibirsk MASHINA GRAFIKA I YEYE PRIMENENIYE in Russian 1979 signed to press 13 Aug 79 p 107

[Excerpt from article by L. F. Vasil'yeva from book edited by A. M. Matsokin, Computer Center, Siberian Department, USSR Academy of Sciences, 1979, 600 copies, 132 plus pages]

[Excerpt] Described in the present article are operational means assuring the functioning of the BESM-6 computer with a standardized main-line exchange (UMSO). The operational means represent a program interface of the connection of the BESM-6 with the UMSO. The program interface consists of two parts. The first part includes a program working under mathematical (unprivileged) conditions and containing access to extracodes that assure connection with UMSO subscribers. The second part includes system programs (non-residents) of the DISPAK disk operating system which contains the bodies of those extracodes.

A list of UMSO extracodes is presented. Distinctive features of the program interface are noted, connected with the technical realization of the equipment interface of the BDSM-6 computer and the UMSO, and also with the UMSO and its subscribers.

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PRINCIPLES OF CONSTRUCTION AND REALIZATION OF THE MODULAR GRAPHIC SYSTEM SIGAM

Novosibirsk MASHINAYA GRAFIKA I YEYE PRIMENENIYE in Russian 1979 signed to press 13 Aug 79 pp 5-6, 39

[Excerpts from article by V. I. Dvorzhets edited by A. M. Matsokin, Computer Center, Siberian Department, USSR Academy of Sciences, 1979, 600 copies, 132 plus pages]

[Excerpts] The graphic form of data presentation is widely used in planning, designing and scientific research. Graphic devices for the depiction of data from computers and corresponding software systems have become widely distributed [1,2,8,9]. The number of graphic devices (displays) for which special dialog systems have been and are being developed is increasing [3,7,8].

Tasks in the storage and processing of graphic information in electronic computers are acquiring great importance [12,13]. Very often a need arises for expansions and modifications of machine graphics programming systems, and also for the generation of some special versions of such systems. In many cases this permits substantially increasing the processing rate and reducing the volume of the occupied storage.

To solve these problems, on the basis of an investigation of graphic systems and algorithms a new graphic system SIGAM (sistema graficheskikh arkhivov i moduley--system of graphic archives and modules) has been developed. The basic principles of the SIGAM system have been presented in [4]. An expanded account of the principles of construction and of some methods of realization of the system is given in the present article.

1. The Purpose of Creation

One of the first Soviet general-purpose graphics systems was the SMOG system (sistema matematicheskogo obespecheniya graficheskikh ustroystv--graphic devices software system) [10,11]. The developments of different versions, modifications and expansions [3,6] of SMOG have given very valuable experience. Work on machine graphics in the USSR and abroad also has been

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analyzed. It has become clear that, firstly, simple expansion of the SMOG will not solve all the new tasks and, secondly, during expansions the system loses its main qualities--simplicity and technological efficiency.

This occurred mainly due to the inadequate modular character of the SMOG and also due to the fact that some solutions adopted in the initial stage of the work, in 1969-1971, proved to be unsuitable in the new situations. This had to do with both the external formulation of some first-level procedures [10] (such as KEY, CHANNEL, SHEET and SYMO) and also adopted agreements on the connections between procedures and parts of the system. In addition, in the SMOG there are practically no archive and dialog devices, or means of processing figures and work with three-dimensional objects. It also was necessary to expand the library of symbols (having made it interchangeable) and the buffer part (to add dialog channels and improve the graphic output channels). It did not seem possible to solve all these problems remaining within the SMOG framework. At the same time, because of the fairly wide distribution of SMOG and the presence of a fairly successful second level [11] in that system, the system that is to replace it must assure continuity.

Thus the new system must present the user with dialog and archive devices, means of construction and processing graphic objects and means of generation and modification of the version of the system itself. It must be substantially modular and also assure continuity with respect to the SMOG, and on the second level its compatibility with the SMOG must be assured.

BIBLIOGRAPHY

1. Bayakovskiy, Yu. M., et al. GRAFOR: Complex of graphic programs in FORTRAN. No 5. Structure and basic principles. Moscow, B. I., 1975, 58 pages (Preprint/IMP USSR Academy of Sciences; 90).

2. Vasil'yeva, L. F., Gorin, S. V., Dvorzhets, V. I., et al. SMOG. System of graphic devices software of the Computer Center, Siberian Department, USSR Academy of Sciences. In the book: Materialy VI Konferentsii po ekspluatatsii vychislitel'noy mashiny BESM-6 (Materials Presented at the Sixth Conference on Operation of the BESM-6 Computer) Tbilisi, 19-23 Oct 76. Software. Tbilisi, 1977, pp 128-139.

3. Gorin, S. V., and Dvorzhets, V. I. SMO (Software system) of display for the M-222. In collection: Mashinnaya grafika i yeye primeneniye (Machine Graphics and Its Application). Novosibirsk, 1974, pp 36-46.

4. Dvorzhets, V. I. Basic principles of the SIGAM graphic system. AVTOMETRIYA, 1978, No 5, pp 18-25.

5. Debelov, V. A. The buffer part of the SMOG. In collection: Mashinnaya grafika i yeye primeneniye. Novosibirsk, 1974, pp 19-37.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

6. Debelov, V. A., and Matsokin, A. M. KARAT microfilming software. Novosibirst, B. I., 1977, 17 pages (Preprint/Computer Center, Siberian Department, USSR Academy of Sciences; 60).

7. Debelov, V. A., and Matsokin, A. M. Structure of graphic display software. AVTOMETRIYA, 1978, No 5, pp 85-86.

8. Katkov, V. L. Software of machine graphics to solve scientific-technical problems. In collection: Vychislitel'nyye sistemy (Computer Systems). Novosibirsk, 1977, No 71, pp 3-13.

9. Kobelev, V. V. Mashinnaya grafika dlya sistemy BESM-ALGOL (Machine Graphics for the BESM-ALGOL system). Moscow, Nauka, 1978, 175 pages.

10. Matematicheskoye obespecheniye grafopostroiteley. I uroven': SMOG. Instruktsiya po programmirovaniyu (Plotter Software. Level 1: SMOG. Programming Instructions), Yu. A. Kuznetsov, editor. Novosibirsk, B.I., 1976, 116 pages. Siberian Department, USSR Academy of Sciences, Computer Center.

11. Matematicheskoye obespecheniye grafopostroiteley. II uroven': SMOG. Instruktsiya po programmirovaniyu (Plotter Software. Level 2: SMOG. Programming Instructions). Yu. A. Kuznetsov, editor. Novosibirsk, B.I., 1976, 78 pages. Siberian Department, USSR Academy of Sciences, Computer Center.

12. Christensen, C., and Pinson, E. N. Multi-function graphics for a large computer system. In: APIPS Conference Proceedings, 1967, FJCC, Vol 31, pp 697-711.

13. Boullier, P., Gros, J., Lancene, P., et al. METAVISU. A general purpose graphic system. In: Graphic Languages. Amsterdam-London, North-Holland Publishing Company, 1972, pp 244-267.

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RASTER GRAPHIC CHANNEL IN THE SYSTEM SMOG-BESM-4M

Novosibirsk MASHINAYA GRAFIKA I YEYE PRIMENENIYE in Russian 1979 signed to press 13 Aug 79 p 107

[Excerpt from article by Ye. V. Vishnevskiy, V. I. Dvorzhets and I. G. Nikkel' from book edited by A. M. Matsokin, Computer Center, Siberian Department, USSR Academy of Sciences, 1979, 600 copies, 132 plus pages]

[Excerpt] The SMOG-M system [1] has become widespread on the M-20 computer. One version of that system [2] has been successfully used for several years in the Computer Center of the Siberian Scientific Research Institute of Geology, Geophysics and Mineral Raw Material (SNIIGGIMS) on BESM-4M computers. In that version three graphic output channels have been realized on Benson-121, Vektor-1301 and Atlas-2M plotters, and a second mathematical channel was realized by two physical channels for the Vektor-1301 and the Atlas-2M.

The first level of the SMOG-M system assures connection with a graphic device; it orders and protects the region of drawing (LIST); it permits drawing segments of straight lines, symbols, numbers and pieces of connected text; it introduces various Cartesian coordinate systems; it monitors errors and presents service possibilities. The first level is realized in the form of structured programming and can be placed in any memory stack. In work with ALPHA and TA-1M systems the user is prsented the possibility of turning to the first level as to a set of procedures.

The second level of the SMOG-M system permits solving specialized graphic problems, using the first level as a basis.

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SMOG FOR YeS COMPUTERS AND ASVT (MODULAR SYSTEMS OF COMPUTER TECHNOLOGY)

Novosibirsk MASHINAYA GRAFIKA I YEYE PRIMENENIYE in Russian 1979 signed to press 13 Aug 79 p 91

[Excerpt from article by V. I. Dvorzhets, V. I. Torshin and S. A. Ygol'nikov from book edited by A. M. Matsokin, Computer Center, Siberian Department, USSR Academy of Sciences, 1979, 600 copies, 132 plus pages]

[Excerpt] The graphic devices software system (SMOG) realized on the BESM-6 computer [1,2] and the M-20 computer [3] has been developed since 1969 and began to be widely used in 1971-1972. In 1975 the development of an SMOG version for computers of the YeS series was undertaken. In 1976-1978 SMOG versions for disk operating systems of modular systems of computer technology and YeS operating systems were developed and realized. The present article is devoted to a description and summing up of certain results of the operation of those versions.

In the development of variants of SMOG for the YeS and modular systems of computer technology the authors took as a basis the most developed SMOG version--the BESM-6 SMOG [1,2]. Practically complete compatibility was assured with that version, down to the coincidence of almost all the communications issued by the system to the printer.

For the user the main difference between the YeS and modular systems of computer technology SMOG versions from the BESM-6 SMOG consists in change of the names of the procedures (while the parameter lists are preserved). This resulted from limitations of the use of Russian letters in the identifiers. The rest of the differences are involved with distinctive features of presentation of the text contents and of output from the program libraries.

From the systems point of view the YeS and modular systems of computer technology versions are somewhat simpler and have fewer possibilities. A system of version generation is lacking. There is no addition of system blocks from an external memory.

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ECONOMIC APPLICATIONS
GENERAL TREATMENT

STATE COMMITTEE ON SUPPLY COMPUTERIZES MONITORING WORK

Moscow MATERIAL'NO-TEKHNICHESKOYE SHABZHENIYE, SERIYA 4 in Russian, Vyp 2, 1980 signed to press 24 Jan 80 p 11

[Article by Ye. G. Torchinskiy, deputy division chief at the Main Computing Center of USSR Gossnab: "Automated Information Reference System for USSR Gossnab Monitoring." Material received 18 Oct 79]

[Excerpts] The Main Computing Center of USSR Gossnab has developed and turned over for industrial use an automated information reference system to monitor performance of orders related to the monitoring function of USSR Gossnab (AIS IK). The AIS IK is designed for operational monitoring of performance of the decrees and orders of administrative bodies.

The AIS IK has been realized on the Sistema 4-50 computer of the Main Computing Center of USSR Gossnab. The system's program package is written in COBOL.

Introduction of the AIS IK has made it possible to provide the leaders of USSR Gossnab and the performing subdivisions with exhaustive information on progress in performance of jobs, to significantly reduce the volume of unproductive manual operations while increasing the number of jobs being monitored, to raise the general sophistication of labor, and to reinforce the accountability of managers and performers.

Further information is available at this address: Moscow, Promyshlenyy Prospekt, Building No 3, Main Computing Center of USSR Gossnab.

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REVIEW OF PLANS, PROGRESS ON NATIONWIDE AUTOMATED SYSTEM

Moscow KLASSIFIKATORY I DOKUMENTY in Russian, Vyp 2, 1980 signed to press 16 Jan 80, pp 2-4

[Article by V. I. Maksimenko, doctor of economic sciences, USSR State Committee on Science and Technology: "The Principal Directions of Development of Automated Control Systems." Material received 16 Feb 79]

[Excerpt] The desire of every enterprise and organization to have its own computer has resulted and still today often results in dispersion of computer equipment, reduction in computer loading, and duplication of software design and compilation work. This approach also limits opportunities for automating control at the many small and medium-sized enterprises.

A realistic alternative to the existing approach is to combine collective and individual use of computer equipment on the basis of the OGAS [Nationwide Automated System] being set up in the country and its technical basis, the GSVTs [State Network of Computer Centers] and the OGSPD [Nationwide Data Transmission Network].

The objective of the OGAS is to unite all the automated control systems: USSR Gosplan, the state planning committees of the Union republics, the automated systems of other central bodies (the USSR Central Statistical Administration, USSR Gossnab, USSR Gosbank, and others), republic and territorial automated control systems, and the automated control systems of ministries, departments, associations, and enterprises in order to insure efficient interaction among national economic management agencies at all levels in solving the problems of accounting, planning, and management.

The automated systems at all levels of control which interact within the framework of the OGAS will resolve interdepartmental problems on the uniform technical basis of the GSVTs and OGSPD.

The USSR State Committee on Science and Technology is engaged in a project to select 45-50 computing centers at which collective-use

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computing centers will be set up during the 11th Five-Year Plan as the first phase or the GSVTs.

One of the key advantages of the GSVTs is a significant reduction in one-time capital expenditures for the development of automated control systems and computing centers and ongoing costs of operating them, as well as a sharp rise in the technical-economic work indexes of enterprises, organizations, and institutions. Specific expenditures to establish automated control systems and computing centers are dropping especially fast as the GSVTs is established; standard designs can be used extensively for them.

At the same time expenditures for the use of automated control system hardware are decreasing, especially with the transition to the new YeS series of computers (1978-1982). The average cost of processing a unit of information with these machines will be just two-fifths of the cost with existing YeS computers. It is expected that design costs will drop to 40-50 percent of their present volume.

Savings may also be achieved by broader use of the uniform nationwide stock of algorithms and programs, standardization of the system of indexes, introducing a uniform system for classification and coding of data, and automation of the management of price classifiers and calculations, tariffs, and standards. All this will make it possible to reduce the payback time of automated control systems.

General sectorial guidelines are very important for the methodological, software, and hardware uniformity of the automated control systems being built.

One of the primary areas of development and introduction of automated control systems is formulating standard subsystem designs and standard planning documents (technical specifications, contract and detail designs), including planning documents related to the interaction and combination of automated control systems in the OGAS. The use of standard design concepts makes it possible to cut the time and cost required for development and introduction of sectorial and enterprise automated control systems in half.

Important work has been done to establish sound prices and tariffs for jobs and services by economically accountable computing centers. A series of other steps is also planned, the most important being setting up collective-use computing centers, which will make it possible to solve new planning problems and provide information service to small and medium-sized enterprises and sectors in the nonproduction sphere.

Some of the most important organizational-technical activities need only be carried out. The most important one is insuring fulfillment

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of the program ratified by the USSR Council of Ministers in 1977 under the name "Comprehensive Program of Work for the Development, Production, and Application of Computer Technology in the National Economy Until 1990."

Regular sample studies of the efficiency of automated control systems produced according to the uniform program, monitoring of timely introduction of automated control systems and correct expenditure of allocated capital, and systematic primary accounting and reporting must be organized.

Building the OGAS and its technical base, the GSVTs and OGSPD, is a highly complex, long-term problem. It can only be accomplished through the joint efforts of scientists, planners, and management employees cooperating on the basis of a uniform nationwide program of work.

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GENERAL INFORMATION
PERSONALITIES

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Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 p 108

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ANNOTATIONS OF DOCTORS' DISSERTATIONS

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 p 107

[Unsigned Article]

[Text] Vladimir Yevgen'yevich Prokof'yev (Odessa Polytechnical Institute), VOPROSY TEORIYA I POSTROYENIYA DISKRETNO-ANALOGOVYKH SETOCHNYKH PROTSESSOROV DLYA AVTOMATIZATSII ISSLEDOVANIYA OB'YEKTOV S RASPREDELENNYMI PARAMETRAMI (Problems of the Theory and Structure of Digital-Analog Grid Processors for Automating the Investigation of Objects with Distributed Parameters), Specialty 0.5.13.13.

The dissertation is on the theory and application of specialized computer means to solve the applied problems of field theory.

The author has developed the principles of constructing a new class of grid mathematical machines -- automated grid processors with pulse-width controllable parameters on a modern element base. They permit the solution of linear and nonlinear parabolic partial differential equations.

On the basis of the controllable grid processors methods are proposed for constructing parallel computation structures for solving applied direct and inverse problems of thermal conductivity and the control of thermophysical objects with distributed parameters. The application of the developed computers will expand the functional possibility, increase the information deficiency and effectiveness of using specialized computer means oriented toward the solution of the problems of field theory.

The results obtained have great applied significance and represent a new prospective area of computer engineering.

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ANNOTATIONS OF MODULAR ANALYSIS ARTICLES

Novosibirsk MODUL'NYY ANALIZ in Russian signed to press 24 Dec 78 p 111-113

[Annotations from book edited by Yu. I. Shokin, Institute of Theoretical and Applied Mechanics, Siberian Department USSR Academy of Sciences (ITPM SO AN SSSR), Novosibirsk 1978, 500 copies, 114 plus pages]

[Text] Annotations

UDC 518.12 + 518.5

COMPLEXES OF PROGRAMS FOR THE SOLUTION OF SOME PROBLEMS OF CONTINUUM MECHANICS, by A. N. Valiullin, V. P. Voronko, P. I. Koskin, Yu. V. Krivtsov, V. I. Paasonen and R. I. Safin.

Complexes and applied programs for the BESM-6 and YeS-1022 computers for the solution of a number of problems of continuum mechanics, created in the computer methods laboratory of the scientific research sector of Novosibirsk State University, are described in the paper. Bibliography: 12 items; 6 illustrations.

UDC 519.632.4

METHOD OF FICTITIOUS REGIONS FOR PROBLEMS OF THE THEORY OF ELASTICITY IN STRESSES, by A. N. Konovalov, Zh. L. Korobitsyna and S. B. Kuznetsov.

The method of fictitious regions is used to solve an axisymmetric problem of the theory of elasticity in stresses in a region with a curvilinear boundary. A numberical comparison is made of the method of fictitious regions with the method of curvilinear coordinates. Bibliography: 5 items, 7 illustrations, 3 tables.

UDC 519.63

MODELLING THE CONDITIONS OF A FREE EDGE IN THE PROBLEM OF BENDING OF A PLATE, by A. N. Konovalov and V. I. Moskalenko.

The authors examine the possibility of modelling by the method of fictitious regions the conditions of a free edge in problems of the bending of thin plates. The results of comparison of solutions obtained with the proposed method and with the analytical are presented in the article. Bibliography: 6 items, 3 illustrations, 4 tables.

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UDC 550.345

A METHOD OF CALCULATING TSUNAMI WAVE GENERATION AND PROPAGATION IN A BASIN OF VARIABLE DEPTH, by An. G. Marchuk

Examined in the article is the method of calculating the generation and propagation of tsunami waves separately in various parts of a basin gluing of the solution together. The size of the step in time is selected according to where the count is to be made, in the deep or shallow part of the basin with subsequent gluing of the solution. The calculations are made by means of an explicit finite difference scheme within the framework of equations of the shallow water. Bibliography: 1 item, 4 illustrations.

UDC 533.6.013.42:718.74

MODULAR ANALYSIS OF SOME PROBLEMS OF AEROELASTICITY, by A. P. MIKHAYLOV.

Main and auxiliary program modules are distinguished and a brief description of the package is given for numerical investigation (by finite difference methods) of nonlinear autooscillations of a plate in a stream. Bibliography: 5 items, 1 illustration.

UDC 519.688

ONE VARIANT OF AUTOMATION OF THE APPLICATION OF INTEGRAL METHODS BASED ON THE MODULAR PRINCIPLE, by Sh. A. Nazirov and Z. Kh. Yuldashev.

The paper describes a system for automating the application of interval methods that permits construction of interval expansions on a computer and differentiating and computing the values of the interval-significant functions. The specific possibility is realized by a corresponding monitor that works on the modular principle. Examples of the operation of the system are presented. Bibliography: 12 items.

UDC 533.6.011

ALGORITHM FOR SOLVING THE PROBLEM OF DECOMPOSITION OF AN ARBITRARY DISCONTINUITY FOR BRANCHED CHANNELS AND THE MODULAR STRUCTURE OF THE PROGRAM, by S. V. Pavlov

The paper describes a constructive method of finding a solution for the problem of the decomposition of an arbitrary discontinuity of gas parameters for a unit in which three channels adjoin. The modular structure of a program realizing the presented algorithm is described. Bibliography: 7 items, 2 illustrations.

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COMPLEX OF PROGRAMS FOR SOLUTION OF THE PROBLEMS OF DECOMPOSITION OF A DISCONTINUITY AND ITS APPLICATION IN NUMERICAL CALCULATIONS OF GAS FLOWS IN CHANNELS WITH A COMPLEX CONFIGURATION, by I. K. Yaushev.

The paper describes subroutines intended for the solution of problems in the decomposition of a discontinuity and formulated in the form of subroutines of the FORTRAN langusge. These subroutines are finding application in calculations of gas flows in channels with a complex configuration. An example is given of calculation of the flow of gas in a channel of a prescribed form. Bibliography: 9 items, 4 illustrations.

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AUTOMATED AIR POLLUTION MONITORING SYSTEMS

Kiev AVTOMATIZIROVANNYYE SISTEMY KONTROLYA ZAGRYAZNENNOSTI VOZDUKHA in Russian 1979 signed to press 27 Oct 78 pp 2, 158

[Annotation and table of contents from book by Aleksandr Nazer'yevich Shcherban, academician, Ukrainian Academy of Sciences; Al'fred Viktorovich Primak, candidate of technical sciences; and Vyacheslav Ivanovich Kopeykin, candidate of technical sciences, Izd. Tekhnika, 5,000 copies, 160 pages]

[Text] Problems of environmental protection, specifically, atmospheric pollution, are considered in the book and modern methods and automatic equipment for monitoring and measuring the concentrations of harmful ingredients of the air in cities and industrial centers are outlined. The principles of construction, the qualitative characteristics and the characteristic features of using the first domestic automated air pollution monitoring systems (ASKZV) were developed and investigated in detail. Methods of solution and the prospects for development of automated air-quality control are considered.

The book is intended for engineering and technical personnel.

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AUTOMATION, PULSE AND COMPUTER TECHNOLOGY

Moscow OSNOVY AVTOMATIKI, IMPUL'SNOY I VYCHISLITEL'NOY TEKHNIKI (Principles of Automation, Pulse and Computer Technology) in Russian 1979 signed to press 14 May 79 pp 2, 389-91

[Annotation and Contents of book by Pavel Moiseyevich Gritsevskiy, Aleksandr Yevgen'yevich Mamchenko and Boris Mikhaylovich Stepenskiy, Izd. "Sovetskoye Radio," 40,000 copies 392 pages]

[Text] This book has three parts. The first contains information about pulse processes in the simplest electrical circuits, pulse elements and more complex circuits, used in automation devices and computer technology. The second part presents principles of construction and arithmetic and logical principles of digital computers and their basic elements, sub-assemblies and devices are examined. The third part gives information about the basic elements of automation and telemechanics, formulates the principles of construction and analysis of automated and telemechanical systems.

For students of Railroad Transport Tekhnikums in "Radio communications and radio broadcasting," "Line communication in transport" and "Use of electronic automata and machines in railroad transport" specialties and also for teachers and students of other special educational institutions at a high school level and practical workers involved in the use of equipment of automation and computer technology. Drawings: 266, tables: 18, References: 12.

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BIOMETRIC CALCULATIONS ON THE MIR-2 COMPUTER

Moscow BIOMETRICHESKIYE RASCHETY NA EVM "MIR-2" in Russian 1979 signed to press 31 Oct 79 pp 2, 4, 123-124

[Annotation, excerpt from foreword and table of contents from book by Valentin Leonidovich Andreyev, Izd. "Nauka, 2200 copies, 124 pages]

[Text] The book presents programs in the "Analitic" language for machine processing of statistical materials and biological data particularly hydrobiological and ichthyological. Typical programs make it possible for specialists in various filed of science to utilize statistical means independent of the level of mathematical preparation.

The book is intended for a wide group of biologists, hydrobiologists and ichthyologists, as well as medical men, geographers and other specialists concerned with processing extensive digital material.

[Excerpt] Foreword

The programs are written in ANALITIK language and are intended for the "Mir" series of computers. The programs can be relatively easily rewritten in ALGOL language and used for any type of machine operating on ALGOL.

In this book, one of the first attempts is evidently being made to create a manual for using computers in biology. It is possible that the manual contains shortcomings. The author would be very grateful for critical remarks and suggestions concerning the book which should be directed to: 690000, Vladivostok, 17 Uborevich Street, Pacific Ocean Institute of Geography, Geocybernetics Laboratory.

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COMPUTERS IN AGRICULTURE

Kishinev AVTOMATIZATSIYA PLANIROVANIYA I UPRAVLENIYA SEL'SKOKHOZAYSTVENNYM PROIZVODSTVOM (Automated Planning and Control of Agricultural Production) in Russian 1978 signed to press 16 Aug 78, pp 2, 10, 120

[Annotation, Excerpts and Contents from book by Vasiliy Yakimovich Uzin, "Kartya Moldovenyaske", 1978, 120 pp., 1000 copies]

[Text] This book presents the principles of economic cybernetics as a theoretical basis for the creation of an ASU (automated system of control) in agriculture and problems in designing the ASU. The organization and functional structure of the agricultural ASU is considered for the case of the Moldavian SSR and the results of its development and introduction in the republic are analyzed.

In this work particular attention is devoted to issues in the automated calculation of prospective plans for the development of agricultural production, co-ordination of optimal plans of enterprises, associations, regions, ministeries and departments, provision of incentives for their accomplishment, mechanization and automation of the solution of bookkeeping problems, economic analysis, and operational control.

This book is intended for a broad range of specialists in agriculture, graduate students and students in agricultural VUZ's, staffs of Scientific Research Institutes, computer centers and organizations designing ASU's.

[Excerpts] In order to improve control of agricultural production and related sectors in the Moldavian SSR, 15 ASU's are being developed.

In the last five-year-plan, more than 15 million rubles were spent on all these ASU's, in the present almost 30 million rubles are planned to be spent. The first instances of certain of the enumerated ASU's have been put into use.

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COMPUTERS IN FORESTRY

Moscow EVM V LESOUSTROYSTVE (Computers in Forest Management) in Russian 1979, signed to press 28 Aug 79 p 2

[Annotation from book by Ivan Mikhaylovich Bochkov, Arkadiy Grigor'yevich Kostenko, Yuriy Ivanovich Burnevskiy, Lesnaya promyshlennost', 2,550 copies, 136 pages]

[Text] This book describes an experiment in the use of second generation computers in forest management; the results of scientific-research work on the creation of software for the Unified System Computer in forest management are cited; algorithms and a synopsis of programs created for the ASU (Automated System of Control) subsystem "Processing of forest management information," which was created on the basis of third generation computers are given; prospects for the future development of the system are described.

This book is intended for specialists in forestry, involved in the processing of forest management information, and workers in forestry computer centers. It may be useful to specialists in related sectors using forest management information.

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COMPUTER TECHNOLOGY AND QUESTIONS OF CYBERNETICS

Moscow VYCHISLITEL'NAYA TEKHNIKA I VOPROSY KIBERNETIKI, VYPUSK 13 in Russian 1977 signed to press 14 Jan 77 pp 2, 183

[Annotation and table of contents of collection of articles, T. G. Batenina, Chief Editor, Izdatel'stvo Moskovskogo Universiteta, 2740 copies, 183 pages]

[Text] Annotation

Issue No 13 of the collection is devoted to the following themes: digital machines in education, digital machines architecture, systems programming and questions of automata theory. Included in the issue are a description of an automated system based on a small digital machine and a multiplexer used in it, descriptions of operational systems of package processing for the BESM-4, articles on the realization of an instrumental language and on the storage of data in translators, on the construction of stack machines with a variable number of addresses of instructions, on iterational dividing circuits, on some subroutines for small digital computers, on minimization of systems of generalized partial functions of Boolean algebra and on automata with prediction of the input sequence symbols, and on the presentation and transformation of syllogistic judgments on Lewis Carroll diagrams. The collection is intended for specialists in digital technology, programmed study, systems program, automata theory, and also for instructors, graduate students and undergraduates of VUZ's.

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COMPUTER TECHNOLOGY IN COMMUNICATIONS TECHNOLOGY AND SYSTEMS

Moscow VYCHISLITEL'NYYE SREDSTVA V TEKHNIKE I SISTEMAKH SVYAZI VYPUSK 4 in Russian 1979 signed to press 3 Oct 79 p 2, 137

[Annotation and table of contents from collection of articles edited by S. D. Pashkeyev, Izdatel'stvo "Svyaz'," 4000 copies, 137 pages]

[Text] Annotation

The book is based on materials presented at an All-Union scientific and technical symposium on "The application of electronic computers in switching technology." The authors examine questions of data transmission and conversion and the organization of communications systems with the application of electronic computers. The book is intended for scientific workers specializing in the area of research and development of quasi-electronic, electronic and integrated communications systems.

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COMPUTER-USER COMMUNICATION

Moscow ABONENTSKIYE USTROYSTVA DLYA SVYAZI S EVM (Users' Devices for Communication with Computers) in Russian, 1979 signed to press 4 Jul 79 pp 2-3, 32

[Annotation, Foreword, Tables and Contents from book by Aleksandr Pavlovich Gerasimenko and Boris Vasil'yevich Nikolayev, "Svyaz'", 6,000 copies, 112 p]

[Text] This book describes existing devices and systems designed for communication of the user with information process-computing machines, used in the ASU [automated system of control]. Design and engineering data are given for input-output users' devices, and variants for connecting these devices to the computer are compared. Forms of man-machine conversation are examined as well as the basic procedures for exchange of signals between the terminal devices and computer.

This book is intended for engineering technical workers involved in designing ASU and information processing systems.

FOREWORD

The basic trends in the development of the USSR national economy from 1976-1980 were stipulated to be "the equipping of industry with progressive types of equipment, broad development of new technological processes and also the use of systems of control of the quality of output" on the basis of the further development and increase of the efficiency of automated systems of control. The technology of computers and communication devices plays an important role in the effective implementation of these measures. In this connection the output of devices of computer technology must grow by a factor of 1.8, the extent of intercity telephone lines by a factor of 1.6 and the number of telephones by a factor of 1.4.

The integration of communications devices and the devices of computer technology, in its turn, increases the effectiveness of computer systems because of the improved organization of the intercommunication of man and computer. The problems which arise relating to the description of the methods and technological devices which permit conversation between man and computer and make it possible to obtain hard copies of this conversation are the subject of this book. A significant place has been allocated to the description of the construction of centers of active user devices.

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It is necessary to take into account that the correct selection (or construction) and arrangement of users' devices in the equipping of the information processing-computer center has a pronounced effect on the economy of the system, since the cost of the devices for communication and users' outfits comprises 40-60% of the total expenditure on the creation of the system.

One of the most important ways to improve users' devices and apparatus for the transmission of data is the wide scale incorporation of the achievements of microelectronics. The successes of semiconductor integrated technology makes it possible to lower the cost and increase the reliability of users' devices-displays and high speed printers. At present, portable pocket-sized users' devices have been developed, as well as unique gigantic systems for mass use. Standardization of parameters and unification of centers of series produced users' devices is going on. Users' devices have begun to be equipped with micro- or mini-computers with various sets of programs which increases productivity in the processing of information. Apparatus has been developed which makes possible use of communication channels and lines more profitable.

In this connection the authors consider the publication of their book timely and express appreciation to V. M. Yashchin, the editor-in-chief V. M. Malyutin and especially to the reviewer G. P. Divnogortsev, who aided in the production of the manuscript and made a number of important and valuable comments which led to improvement in the contents of the book.

Comments on the book should be sent to the publisher "Svyaz'" at the address: 101,000, Moscow, Chistoprudnyy bul'var, 2. The Authors.

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Table 2.1

Characteristic	YeS-7061	YeS-7063	YeS-7064	YeS-7066	YeS-7925	YeS-7927
Type of Display	Alpha-numeric	Alpha-numeric	Graphic	Alpha-numeric	Alpha-numeric	Alpha-numeric
Size of screen, mm	250	250	430	430	430	430
Capacity of buffer memory, bits	1024	1024	4096	4096	480, 1920	480, 1920
Number of characters	64, 96	64, 96	94	94	96	96
Speed of data transmission, bauds	100 thous	100 thous	500 thous	500 thous	600, 1200, 2400, 4800, 9600	760-854 thous
Additional equipment	---	---	Light pen	---	Photoreader	Photoreader
Power used, kVA	0.32	0.38	2.0	0.25	0.3	0.3
Dimensions, mm	420X620X350	420X620X350	1200X750X1600, 1490X660X700, 660X600X500	730X480X470	575X475X460	575X475X460

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Table 4.1

Capability of MPD for Operating with Communication Links

Data Transmission Multiplexor (MPD)	Maximum number of channels Semi-Duplex	Duplex	Speed Bauds	Switching	Non-Switching	Telegraph Switching (50 Bauds)	Telegraph Non-Switching (50 Bauds)	Broad Band	Telegraph Switching (200 Baud)	Telegraph Non-Switching (200 Baud)	Physical Circuits	With Double Point Switch	With Multi Point Switch
MPD-1A (YeS-8400)	15	7	50-4800	*	*	*	*			*	*	*	*
MPD-1 (YeS-8401)	64	4	50-2400	*	*	(*)	*		(*)	*	*	*	*
MPD-2 (YeS-8402)	176	88	50-4800	*	*	*	*		*	*	*	*	*
MPD-3 (YeS-8403)	4	2	50-48000	*	*	*	*	*		*	*	*	*
MPD-4 (YeS-8404)	12		200-1200	*	*						*	*	*
MPD-1 (YeS-8410)	15/32		50-2400	*	*	(*)	*			(*)	*	*	*

Note: (*) indicates a secondary capability

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CONTROL OF DISTRIBUTED SYSTEMS WITH NONSTATIONARY ACTION

Moscow UPRAVLENIYE RASPREDELENNYMI SISTEMAMI S PODVIZHNYM VOZDEYSTVIYEM in Russian 1979 signed to press 28 Aug 79 pp 2, 256-258

[Annotation and table of contents from collection of works edited by A. G. Butkovskiy, Izd. "Nauka," 1,200 copies, 258 pages]

[Text] This collection is devoted to a new class of distributed control systems that have non-stationary action. The papers present theoretical investigations on the problems of control and optimization of these systems, on the solvability of the nonlinear problem of moments which arises in control action, and on problems of the mathematical modeling of the corresponding control processes. Concrete control systems are given for various technological processes with non-stationary energy sources, especially control systems for electron beam heating.

The collection is based on the proceedings of the First Seminar on the Control Problems of Distributed Systems with Non-stationary Action which was held in Moscow, 10-12 January 1978 (the seminar was directed by the Doctor of Technical Sciences, Professor A. G. Butkovskiy and Candidate of Technical Sciences Ye. P. Chubarov).

The work is intended for specialists in automated control.

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CONTROL SYSTEMS AND INFORMATION SUPPORT

Moscow SISTEMY UPRAVLENIYA I INFORMATSIONNOYE OBESPECHENIYE in Russian 1979 p 3

[Table of contents from book edited by Suborov Boris Pavlovich, Central Institute of Economics and Mathematics, Moscow, 299 copies, 199 pages]

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DIGITAL CONTROL SYSTEMS

Kiev KIBERNETIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian vyp 44, 1979 signed to press 26 Jun 79 pp 2, 112

[Annotation and table of contents of Issue 44 of Cybernetics and Computer Technology, Izd. "Naukova dumka," 1000 copies]

[Text] UDC 62.50

The collection is devoted to solving vital problems of digital control systems using specialized computers and devices. Questions of analysis and synthesis of optimum digital control systems are considered on the basis of determinate and random external perturbations. Several articles deal with the practical utilization of digital systems to control physical experiments and technological processes.

Intended for scientific workers, graduate students and seniors at institutions of higher learning.

Editorial board: V. M. Glushkov (chief editor); V. L. Volkovich, G. F. Zaytsev, V. M. Kuntsevich (deputy chief editor); A. I. Kukhtenko (deputy chief editor); V. B. Larin, B. Yu. Kandrovskiy-Sokolov (chief issue secretary); V. S. Mikhalevich, Yu. I. Samoylenko, K. G. Samofalov, A. A. Stogniy, B. B. Timofeyev, A. A. Tunik, N. S. Furs and A. G. Shevelev.

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DIGITAL EQUIPMENT IN COMMUNICATIONS

Moscow TSIFROVYE USTROYSTVA NA INTEGRAL'NYKH SKHEMAKTI V TEKHNIKE SVYAZI (Digital Equipment in Integrated Circuits in Computer Technology) in Russian 1979 signed to press 8 Jun 79 pp 2-4, 230-231

[Annotation, Foreword and Contents from book by Lev Moiseyevich Gol'denberg, Yuriy Tikhonovich Butyl'skiy and Mikhail Nikolayevich Polyak, Svyaz, 15,000 copies, 232 pp]

Presents the principles of the theory of synthesis of combinative devices and finite automata. Methods of implementing digital filters and systems of automated tuning of oscillatory circuits are given particular consideration. A number of digital devices used for control and communication are described.

This book is intended for engineering and technical workers interested in issues of design and practical application of contemporary digital devices in integrated logical circuits.

FOREWORD

[Text] The development and improvement of systems of communication and control to a significant degree have derived from the wide adoption of digital technology. This was a result of the well-known advantages of digital devices in comparison to analog ones: reliability and high stability of parameters and substantial precision in processing of information. Moreover, algorithms of adaptation which are so important for the construction of highly effective systems for information processing can be implemented in digital devices.

The purpose of this book is the consideration of a number of basic issues related to the synthesis of digital devices using integrated circuits and following certain new trends in the use of digital devices in communications technology. The contents of the book, to a significant degree, reflect the authors' experience with the development and use of digital devices.

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The first two chapters of the book are devoted to a consideration of the principles of construction of digital circuits--combinative devices and finite automata with small memory capacity. The basic elements and general methods of synthesis of these digital circuits are also considered here.

Chapter three describes the methodology of construction of pulse generators and shapers in integrated logical circuits.

Chapter four presents the principles of synthesis of complex digital devices--processors. The main focus is on the construction of control automata according to preset microprograms. The structure and system of commands of the microprocessor and microcomputer are also considered here.

Chapter five is devoted to issues relating to the circuit implementation of digital filters (TsF). Special attention is given to the organization of in-line transmission of information in the processing of two or more signals and also to the circuitry of the main units of the TsF--the summators and multipliers. In addition, TsF linkages of various types, the circuit of the digital integrator with finite memory and the implementation of the TsF with a modern microprocessor are examined.

Chapter 6 discusses contemporary methods of synthesizing TsF's, derives coefficients of transfer functions and the number of bits in all the registers of the TsF and in the register of the analog-digital converter (ATsP).

Chapter 7 describes digital devices which solve one of the most important problems in communications technology--that of automatic tuning of oscillatory circuits. In addition, a number of algorithms for tuning and examples of the implementation of the corresponding automata are given.

Naturally, the issues considered in the book far from exhaust the problems of synthesis and use of digital devices. The authors, however, express the hope that the book will be useful to engineers and scientific workers concerned with the development of modern digital devices for communication technology and control.

The authors thank the reviewer V. I. Shlyapoberskiy for the valuable comments he made when reading the manuscript.

Please send comments about the book to the publisher "Svyaz'": 10100 Moscow, Chistoprudnyy bul'var, 2. The Authors.

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DISCRETE PROCESSING OF VOICE SIGNALS

Moscow DISKRETNAYA OBRABOTKA RECHEVYKH SIGNALOV in Russian 1978 signed to press 6 Jan 78 pp 3, 4, 6, 7, 29, 30, 31, 32, 33, 35, 37, 38, 132, 133, 134

[Table of contents, introduction, excerpts, bibliography and abstracts from booklet edited by V. N. Trunin-Donskoy, USSR Academy of Sciences Computer Center, Moscow, 301 copies, 134 pages]

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Introduction

The collection "Discrete Processing of Voice Signals" is devoted th the use of electronic computers for purposes of research and automatic speech recognition. The article "On the Construction of Automatic Speech Understanding Systems" gives a survey of the contemporary state of the problem

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of the "understanding" of oral communications by computers (a survey is presented on the state of the work up to the beginning of 1976).

In the article "Algorithms for Distinguishing the Basic Tone by Spectral methods for Medium Class Electronic Computers" an algorithm is presented for distinguishing the basic tone by the method of logical processing of the resulting spectrum, special stress being place on the realization of an algorithm for rapid Fourier transformation with a medium-capacity computer. Also presented in the collection are articles on the analysis of voice signals by the method of linear prediction and a method using the theory of odd sets. These promising directions of research are now widely used both in our country and abroad.

In the paper "Dynamic Analysis of Tones of Vietnamese by Computer" an attempt was made to investigate the characteristics of a tonal language, Vietnamese, a peculiarity of which is the presence of six types of basic tone that determine the differentiating characteristics of vowels. Averaged graphs of the tones of all types have been constructed and an approximation of them has been proposed. The article by V. S. Pyatkov describes a device for distinguishing the informational parameters of voice signals, made with Soviet integrated circuits. The device permits finding with apparatus the values of the frequency of the basic tone of the formant frequencies, the average signal intensity, the average instantaneous frequency, etc. Thos parameters, fed into an electronic computer, can be used as primary features for the automatic recognition of voice signals.

This collection can be useful to everyone interested in the problem of investigating voice signals and the construction of systems of acoustic "man-automaton" dialogue.

Included in the laboratories and companies in which they have started in the last 5-7 years to study problems in the construction of speech understanding systems are:

in the USSR: L'vov State University, L'vov; the Institute of Cybernetics, Ukrainian SSR Academy of Sciences, Kiev; the Institute of Control Systems, Georgian SSR Academy of Sciences, Tbilisi; the Institute of Mathematics, Siberian Department, USSR Academy of Sciences, Novosibirsk; the Institute of Problems of Information Transmission, the USSR Academy of Sciences, the Computer Center of the USSR Academy of Sciences, Moscow, etc.

In discussing Soviet work on recognition word by word it must be noted that at the start of the 1970's it was not inferior to the American work both from the point of view of reliability and in its possibilities.

Thus, on the basis of the BESM-3 and BESM-6 computers in the Computer Center of the USSR Academy of Sciences three systems of automatic recognition of phrases spoken word-by-word have been developed. The system was described in [34-37].

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The first system [34], realized with a BESM-3 computer, which used a dictionary of 58 words, was intended for the duplication of separate operations in controlling the work of a computer performed by an operator at a panel (the introduction of corrections into a program, monitoring the contents of the immediate-access storage, oral tasks to accomplish exchange between the computer files, etc). In addition, the system of recognition permitted making certain mathematical calculations during vocal issuance of instructions for the calculation of expressions.

The second system, realized with a BESM-3 computer in the Computer Center of the USSR Academy of Sciences, which used a modernized device to distinguish features, was a system for oral input of starting data to solve some problems in the design of a gas pipeline and the transportation of gas. A set of computation algorithms has been prepared by workers of the All-Union Scientific Research Institute of Economics, Organization of Production and Technical-Economic Research in the Gas Industry (VNIIEGAZPROM) for the automated system for control of the gas industry [35,36].

The third system of word-by-word vocal input, created in the Computer Center of the USSR Academy of Sciences, was a portable mathematical panel of the BESM-6 computer, described in [37].

We will briefly describe the work of other research centers of the USSR at which similar systems are being constructed.

In [38] there is a reference to work that had the goal of investigating the possibility of automatic recognition of a problem-oriented dictionary needed for the work of the dispatcher of a seaport (the Murmansk fishing port, for example). The work was done by a group of scientists from the Institute of Mathematics, Siberian Department, USSR Academy of Sciences.

The investigation was conducted with the purpose of using vocal input of data into the automated system for control of the fishing industry fleet of the northern basin.

Dynamic programming is also used in the group of T. K. Vintsyuk (Institute of Cybernetics, Ukrainian SSR Academy of Sciences, Kiev) in the realization of algorithms for the recognition of words and pharses. In [39], in the recognition of 200 words pronounced by a single dictator on 300 pronunciations, very high reliability was obtained--0.5 percent errors and 3 percent failures to recognize.

At the All-Union ARSO-8 [expansion unknown] seminar a group of workers of the Tomsk Polytechnic Institute (N. F. Kucher, B. N. Yepifantsev, etc) demonstrated specialized equipment capable of sensing figures and also the words "add," "multiply," "subtract" and "divide." The equipment functioned with any dictator and permitted obtaining the results of very simple mass operations with data input by voice.

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A clear shortcoming of that device was the need to pronounce some figures in an unnatural manner--"dvoyka" and "troyka" instead of "dva" and "tri." Very simple vocal features were used in the instrument--a voiceless stop in the middle of a word was a vocalic feature.

Equipment for recognition of a limited set of instructions are not produced in series in the Soviet Union. True, a small series of devices for the distinction of vocal features has been produced--one of the devices, connected to an electronic computer by a group under the leadership of G. I. Tsemal' (Institute of Problems of Information Transmission, the USSR Academy of Sciences) is in experimental operation in the Central Dispatcher Administration of Energy Systems of the USSR [40,41].

BIBLIOGRAPHY

1. Zaydenberg, V. K., Matveyenko, N. A., and Tarovatova, Ye. V. Obzor zarubezhnoy vychislitel'noy tekhniki po sostoyaniyu na 1973 (Survey of Foreign Computer Technology as of 1973). Moscow, Institute of Precision Mechanics and Computer Engineering, 1973.

30. Vysotskiy, G. Ya., Rudnyy, B. N., and Trunin-Donskoy, V. N. "A single approach to the recognition of fused speech." In the collection: Analiz i raspoznavaniye rechevykh signalov na EVM (Computer Analysis and Recognition of Voice Signals). Moscow, USSR Academy of Sciences Computer Center, 1975.

34. Vysotskiy, G. Ya., Rudnyy, B. N., Trunin-Donskoy, V. N., and Tsemel', G. I. "Experience in voice control of a computer." IZVESTIYA AN SSSR, TEKHNICHESKAYA KIBERNETIKA, 1970, No 2.

35. Maksimov, Yu. I., Rudnyy, B. N., Sakayev, R. K., and Trunin-Donskoy, V. N. "Prospects of use of vocal input of starting information in a computer storage to solve some operational tasks in distant transportation of gas." In the collection: Raspoznavaniye obrazov. Trudy Mezhdunar. simpoziuma 1971 g po prakticheskim primeneniyam metodov raspoznavaniya obrazov" (Image Recognition. Proceedings of the International Symposium on Practical Applications of Methods of Image Recognition), 1971. Moscow, USSR Academy of Sciences Computer Center, 1973.

36. Rudnyy, B. N. "On the construction of systems of operative data input into computers." In the collection: "Rechevoye upravleniye" (Vocal Control), Moscow, USSR Academy of Sciences Computer Center, 1972.

37. Vysotskiy, G. Ya. "Procedure for formulating problems of limited voice control." Analiz i raspoznavaniye rechevykh signalov na EVM. Moscow, USSR Academy of Sciences Computer Center, 1975.

38. Velichko, V. M. On some methods of automatic recognition of voice signals. Dissertation for Candidate of Physical and Mathematical Sciences degree. Novosibirsk, Institute of Mathematics, Siberian Department, USSR Academy of Sciences, 1971.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

39. Vintsyuk, T. K., and Shinkazh, A. G. Phoneme recognition of words of oral speech: learning algorithm. Tezisy dokladov Vsesoyuzn konferentsii ARSO-8 (Abstracts of Reports Presented at the ARSO-8 All-Union Conference, Lvov, 1974.

40. Vasil'yev, A. V., Krinov, S. N., Savel'yev, V. P., and Tsemel', G. I. A speech recognition system. In the collection: Rechevoye obshcheniye v avtomatizirovannykh sistemakh (Speech Communication in Automated Systems). Moscow, "Nauka," 1975.

41. Vasil'yev, A. V., Raksheyev, S. S., Ryutina, T. Z., and Savel'yev, V. P. System for voice data input into the M-222 computer. Ibid.

42. Tsemel', G. I. Opoznavaniye rechevykh signalov (Voice Signal Recognition). Moscow, "Nauka," 1971.

ABSTRACTS

UDC 518.5:007

Algorithms for Distinguishing the Basic Tone by Spectral Methods for Medium Class Electronic Computers

The article describes in a fairly popular manner complex apparatus for rapid Fourier transformation and spectral methods of distinguishing the basic tone of a voice signal--net, with additive noise and passed through a telephone channel. The limited resources of Soviet medium class computers (BESM-4, M-220, Minsk-32) are examined, and the possibilities of transfer to them of the above algorithms, realized on a BESM-4.

UDC 621.391:518.5

Application of the Theory of Odd Sets to Classify Speech Sounds

The advisability of applying the theory of odd sets to compile a phonetic descripcion of voice signals is substantiated in the paper. The principles of the theory are given, and examples of its use to determine the formant frequencies of vowels and the basic tone.

UDC 621.391:518.5

Investigation of Speech by Means of Linear Prediction

A procedure for obtaining linear prediction coefficients characterizing the transfer function of the vocal tract is described. In conclusion, a program for obtaining the coefficients is described.

UDC 621.391

Integrated Circuit Device for Distinguishing Vocal Features

The article is devoted to the principles of construction of devices for distinguishing voice features for their input into a computer. A brief

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survey of existing speech recognition systems and voice control is presented, the primary analysis of the signal in which is done by a special device. A functional diagram of the UVRP-40 is given, and the circuits of the units included in it.

UDC 621.391

Dynamic Analysis of Tones of Vietnamese Speech by Computer

Questions in distinguishing the basic tone and also of tonal characteristics of Vietnamese speech are examined in the article; the obtained parameters can be used for purposes of automatic recognition.

UDC 621.391:518.5

Investigation of the Averaged Formant Frequencies of Vowels of a Tonal Language for Purposes of Automatic Recognition

The article describes the results of experimental investigation of vowels of Vietnamese speech. The investigation was conducted by means of analysis of spectrograms of "visible speech."

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EUROPEAN CONFERENCE ON CIRCUIT THEORY AND DESIGN-80

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 p 107

[Unsigned Article]

[Text] The European Conference on Circuit Theory and Design (ESSTD) organized by the Association of Polish Electrical Engineers, the Warsaw Polytechnical Institute, the Gdan'sk Polytechnical Institute will be held on 2-5 September 1980 in Warsaw (Polish People's Republic).

The European Conference on Circuit Theory and Design is held once every two years. The previous conferences were held in London (1974), Geneva (1976), and Lausanne (1978).

The given conference will be devoted to all aspects of the theory and design of analog and digital, linear and nonlinear circuits with lumped and distributed parameters, active and passive circuits, the theory of electronic systems, automatization of circuits, mechanical design and simulation of instruments, integrated circuits and systems and also the application of mathematical methods to problems connected with the theory and practice of electronic circuits.

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FACTOR ANALYSIS IN ROCK MAGNETISM

Moscow MATERIALY MIROVOGO TSENTRA DANNYKH B. STATISTICHESKIYE ALGOITMY OBRABOTKI GEOFIZICHESKIKH DANNYKH. VYPUSK 1 (Materials of World Data Center B. Statistical Algorithms for Processing Geophysical Data. No 1) in Russian 1979 signed to press 15 Feb 79 pp 3, 19

[Annotation and conclusion of an article by P. K. Ryabuskin, edited by V. P. Golovkov and Yu. S. Tyupkin, Soviet Geophysical Committee, USSR Academy of Sciences, Moscow, 350 copies, 19 pages]

[Text] Annotation

In this issue the system of factor analysis programs created by P. K. Ryabushkin (Geological Institute of the USSR Academy of Sciences, Moscow) is described. Although the author developed and used this system for a quite specific purpose, namely rock magnetism data analysis, it can be used as well in the solution of a wide range of geophysical problems where factor analysis is applicable.

The given system of programs has been translated from the FORTRAN-IV language into the DOS/YeS operating system with a YeS-1022 computer in the GIN (Institute of Geology, USSR Academy of Sciences). Machine time for a single factorization of 40 parameters is about 10 minutes.
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FORMAL DESIGN OF COMPUTER EQUIPMENT

Moscow FORMAL'NOYE KONSTRUIROVANIYE ELEKTRONNO-VYCHISLITEL'NOY APPARATURY in Russian 1979 signed to press 12 Mar 79 pp 2-5, 255-256

[Annotation, Foreword and Table of Contents from the book by Anatoliy Ivanovich Petrenko and Aleksandra Yakovlevich Tetel'baum, Izd. Sovetskoye Radio, 12,000 copies, 256 pages]

UDC 621.346.6.049.77 001.63

The editorial board of the Radio Designers' Library is N. A. Barkanov, I. A. Brukhanskiy, R. G. Varlamov, V. A. Volgov, N. K. Ivanov-Yesipovich, K. K. Morozov, V. B. Pestryakov (editor in chief), A. I. Pimenov, Ye. M. Parfenov, N. E. Svatnikova, V. I. Smirnov, V. G. Tesel'ko, K. N. Shikhayev, A. V. Shityashin and N. I. Yushin.

Editorial board on problems of space electronics.

Methods of designing equipment based on integrated circuits by using computers and displays (a television graphic information display device) are considered. The use of this equipment reduces the laboriousness of work, reduces the development times and frees the designer from routine, uncreative work.

The book is intended for engineering and technical personnel involved in design of radio apparatus. It will be useful to postgraduate students and students of vuzes.

Introduction

The rates of development of electronics determine to a significant degree the level of scientific and technical progress. The growing need to develop complex radioelectronics apparatus (REA) and especially of computer apparatus (EVA), which is finding ever wider application in the sphere of production and creative activity, is predetermined by this.

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Expansion of the range of problems solved by computers causes constant complication of them, as a result of which lengthening of the design deadlines when using traditional manual methods is inevitable. The deadline can be reduced to a specific level by increasing the collective of designers and developers. However, this method does not lead to solution of the problem for the following reason: first, specific labor productivity is usually reduced due to the difficulties of effective control; second, the errors from mismatching of parts (these errors are usually detected during production and even slight corrections in documentation require new drawings, the volume of which is comparable to the main volume of documentation) are added to the errors which are inevitable during manual design; and third, the number of people which may be engaged in a certain sphere of human activity is limited. The transition to a new technical base--microelectronic integrated circuits (IS) and multilayer assembly, which is now occurring, complicates the design process even more.

Planning and design work can be accelerated and made less expensive only by development and introduction of progressive methods based on advances in the field of computer technology. Development of these methods of design proceeds along the path of maximum formalization and is subject to the conveniences of programming. Automation of design was essentially the third step of the scientific and technical revolution in any industrial sector, the first of which--automation of production processes and control of them--became the culminating fact.

This book is devoted to the timely trend with respect to the national economy and the rapidly developing trend--the use of universal computers and graphical interaction devices in design of EVA. The possibility of using computers to solve design problems is determined by the fact that the most laborious steps of design permit formal description, while designs of EVA assemblies are usually regular in structure. At the same time there is a number of design problems which cannot be subjected to formalization, for example, the problem of designing the morphology of integrated circuits. The use of designer-computer graphical display devices is effective when solving these problems.

Soviet scientists V. M. Glushkov, L. B. Abraytis, S. A. Mayorov, P. P. Sypchuk, V. B. Pestryakov, N. Ya. Matyukhin, M. I. Peskov, A. N. Melikhov, A. A. Tyutin, M. Ye. Shteyn, G. G. Ryabov, K. K. Morozov, A. M. Karapetyan, V. N. Loshakov, G. E. Shiro, V. A. Selyutin, V. M. Kureychik, V. A. Savat'yev, G. V. Orlovskiy, V. N. Kharin, B. N. Den'dobrenko, R. P. Bazilevich and others made an important contribution to development of design automation.

The book contains previously unpublished original results of experimental research in the form of diagrams, graphs and tables.

The book was written during the period 1974-1975 and naturally the most recent publications concerning development of the methods and algorithms of

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formal design are not mentioned in it. Therefore, an additional bibliography is presented at the end of the book for the interested reader. It was assumed when writing the book that the reader is familiar with the elementary fundamentals of the study of combinations and graph and set theory in the mathematics courses for technical vuzes. It is desirable that the material of the book be read in sequence.

We feel it our present duty to thank our colleagues of the Kiev Scientific Research Institute of Microinstruments V. V. Bobovskiy and V. P. Rubtsov and our colleague at the Kiev Polytechnical Institute O. F. Tsurin for advice and presentation of practical materials which were used in writing some sections of chapters 3 and 4.

The authors are very grateful to K. K. Morozov and L. A. Nedostup, who took it upon themselves to review the given book, for their comments and wishes which undoubtedly contributed to improvement of the contents.

The authors are especially grateful to A. A. Kalinovskaya and T. A. Nechiporuk for fast and high-quality preparation of the manuscript for printing.

We would hope that the methods outlined in the book are useful not only in computer design but also in solving similar problems from other fields of technology. We will be grateful for all comments and suggestions, which should be sent to the publishing house at the address: Moscow, 101000, Main Post Office, Post Box 693.

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INTEGRO-ALGORITHMIC CALCULATIONS

Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 2, 1980 p 65

[Article by V. V. Aristov]

[Text] In this monograph a discussion is presented of a nontradiational approach to the analysis and synthesis of various integration procedures. Beginning with the theory of the canonical transfer functions of the numerical integration methods, an original generalization is presented for the Voldera algorithms which expands their application to the area of functionally more complex operators. Significant attention is given to the problems of the structural integration of computational macroinstructions for the microprocessors and computers based on the integro-algorithmic method. An analysis is made of the methods and means of hardware performance of such calculations using redundant coding systems.

The monograph is designed for scientific and engineering-technical workers in the field of computer engineering, applied mathematics and programming, and it can be useful for the students of the higher institutions of learning in the corresponding specialties.

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M5000 COBOL SYSTEM

Moscow SISTEMA KOBOL M5000 (The M5000 COBOL system) in Russian 1979 signed to press 20 Jul 79 p 2

[Annotation from book by Yelena Yuozovna Kapochyute and Eval'das Stepanovich Paulauskas, Izd. "Statistika," 30,000 copies, 247 pages]

This book describes the COBOL system for computer complexes of the M5000 type. It includes an examination of nontraditional means for ordering files, report generation, interprogram linkages, segmentation and debugging at the level of the source language.

This book contains information on the operating system, methods of organization and origination of data, finding bugs in programs and gives illustrative examples. This allows programmers working with M5000 COBOL to do without other documentation.

M5000 COBOL allows use of both the Russian and English versions of the language. Its correspondence to standard and YeS (Unified System) computer COBOL allows this book to be used for the study of COBOL in general.

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MACHINE GRAPHICS AND ITS APPLICATION

Novosibirsk MASHINNAYA GRAFIKA I YEYE PRIMENENIYE in Russian 1979 signed to press 13 Aug 79 pp 3-4

[Table of contents and introduction from collection of scientific works edited by Aleksandr Mikhaylovich Matsokin, Computer Center, Siberian Dipartment, USSR Academy of Sciences, 600 copies, 132 plus pages]

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Introduction

A large portion of the papers presented in this collection of articles is devoted to problems in the development of machine graphics systems and their adaptations to various machine-instrument configurations. In the first article the graphics system SIGAM (sistema graficheskikh arkhivov i moduley--system of graphic archives and modules), constructed on modular principles and having a developed system of graphic archives and libraries. In the second paper a system for control of graphic output is described, one which accomplishes the direct output on graphic devices of information prepared by graphic systems. The third article is devoted to the development of a dialog graphic channel, which is closely connected with the first two papers.

Wide use of the graphic devices software system (SMOG--sistema matematicheskogo obespecheniya graficheskikh ustroystv), developed in the Computer Center, Siberian Department, USSR Academy of Sciences, has caused a need to create versions of it for various electronic computers. The following five articles of the collection are devoted to questions of adaptation of the SMOG system to the YeS, M-4030 and BESM-4M computers.

In the last two articles of the collection, algorithms for depiction of the surfaces of rotation are described, as well as methods of using a SMOG system for the output of meteorological information.

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MEDICAL CYBERNETICS

Kiev KIBERNETIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian vyp. 45, 1979 signed to press 2 Aug 79 pp 2, 107-108

[Annotation and table of contents of Issue 45 of Cybernetics and Computer Technology, Izd. "Naukova dumka," 1000 copies]

[Text] The collection examines questions of automation of the set of medical information, computer diagnosis of several ailments, elaboration of hardware of medical information systems, systemic reactions of the organism to environmental factors, models of some biological processes.

Intended for scientific workers, engineers, biologists and physicians, graduate and undergraduate students, interested in problems of medical and biological cybernetics.

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MICROPROCESSORS IN RADIATION MEASURING DEVICES

Moscow MIKROPROTSESSORY V PRIBORAKH DLYA RADIATSIONNYKH IZMERENIY in Russian 1979 signed to press 23 Nov 78 pp 2, 5-6, 112

[Annotation, Foreword and Table of Contents from book by Lev Solomonovich Gorn, Boris Isaakovich Khazanov and Dmitriy Borisovich Khazanov, Atomizdat, 3,900 copies, 112 pages]

[Text] The book is devoted to problems of using microprocessors in devices and systems designed for radiation measurements. Problems which require the use of computer technology are analyzed. The general operating principles of microprocessors and their structure are considered and some of the most typical models of these devices are described. The main principles of constructing the schematic diagrams of devices and systems with built-in microprocessors and the process of program development and debugging are considered. Examples of constructing some microprocessor devices are presented.

Foreword

Microprocessor technology and its application have now become the most timely topics in modern electronics. Numerous publications are devoted to them in journals, surveys and conference reports. The number of produced microprocessors and related microcircuits is increasing with each year and the sphere of their application is expanded. The future period in instrument building is more and more frequently characterized as the era of microprocessors.

The increased interest in microprocessors is explained by the fact that they are regarded as a means of inexpensive computer control. The low cost of microprocessors and their flexibility permit arrangement of decision-making logic and "assignment of intellect" to devices in which it was previously proposed that computer equipment not be used.

Microprocessors have begun to be used extensively in monitoring-measuring apparatus, including analytical devices, devices for scientific research, production control apparatus and so on. It is possible that considerably

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more complex apparatus in structure, with characteristics considerably better compared to the achieved level, and much simpler to control may possibly be developed in the use of microprocessors. All this is also valid for devices which make radiation measurements.

Although there are no doubts of the advantages of microprocessors, their practical use in monitoring-measuring apparatus is difficult. Whereas the difficulties ordinarily when using new, but already known devices arise in the traditional field of application of microprocessors--in development of computers and ASU TP [Automated technological process control system], the problems are more serious in the fields of electronics based until now on ordinary logic circuits. They are related mainly to changing traditions, the need to master a new component base, new concepts, skills, a shortage of knowledge and understanding of the fundamentals of computer technology and programming.

The appearance of microprocessors, like the appearance of their predecessors earlier--transistors and integrated circuits--is again forcing engineers to study. However, microprocessors will more significantly alter the nature of the work and face of the engineering profession. Conversion from ordinary circuits, methods of testing them and searching for malfunctions to compilation and working out programs, microinstructions, assemblers, interrupt systems and others will hardly be easy for most engineers. However, these efforts are necessary so as to use the new advances of electronic technology in future work.

The proposed book is intended for those engineers who are making the first steps in microprocessor technology. Its limited scope does not permit the outline to be begun from the main concepts of computer technology; we hope that the reader will be able to become familiar with computer fundamentals from the numerous literature available. The dynamics of development of microprocessor technology renders consideration of all the foreign models of microprocessors described in the literature unjustified; new, more improved microcircuits will undoubtedly appear by the time the book is published. Therefore, we attempted to limit the range of considered problems to those common ones inherent to microprocessors in general and to distinguish them from other devices and we attempted to estimate what the use of microprocessors in apparatus for radiation measurements will yield, how the microprocessor and the microprocessor system behave (without going into details), how to start them, how selection of one or another structures of these systems is determined and so on.

The problem could be regarded as complete if the given book at least reduces somewhat the distance between microprocessors and developers of traditional devices and if it will help to understand the main characteristics of microprocessors and work with them and will arouse the interest of those in them who would be indifferent to them for one or another reasons.

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MODULAR ANALYSIS

Novosibirsk MODUL'NYY ANALIZ in Russian signed to press 25 Dec 78 p 2

[Introduction from book edited by Yu. I. Shokin, Institute of Theoretical and Applied Mechanics, Siberian Department, USSR Academy of Sciences, Novosibirsk, 1978, 500 copies, 114 plus pages]

[Text] The present collection contains articles reflecting one of the most important aspects of the development of applied mathematics--modular algorithm analysis.

In the works presented, complexes of programs for the solution of problems of aeroelasticity, tsunamis and flows in channels with a complex configuration are analyzed and methods of data processing during numerical modeling of problems of continuum mechanics are presented. Two papers are devoted to numerical results obtained when the method of fictitious regions is used.

A large portion of the published works was done by scientific associates of the Institute of Theoretical and Applied Mechanics, Siberian Department, USSR Academy of Sciences, and represents the results of investigations conducted in recent years.

The present collection will be of interest to specialists studying numerical methods of solving problems of mathematical physics, and also to undergraduate and graduate students specializing in the area of computational and applied mathematics.

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NUMERICAL METHODS AND PROBLEMS OF ORGANIZING CALCULATIONS

Leningrad CHISLENNYYE METODY I VOPROSY ORGANIZATSII VYCHISLENIY in Russian No 3, 1979 signed to press 24 Jul 79 pp 3, 83, 149

[Table of Contents, Introduction and Partial Bibliography from the collection "Proceedings of Scientific Seminars of the Leningrad Department of the Order of Lenin Mathematical Institute imeni V. A. Steklov, Vol 90," edited by V. N. Kublanovskaya, Izd. Nauka, 2,250 copies, 149 pages]

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THE POSSIBILITY OF MAXIMUM PARALLELISM OF PROBLEMS IN ASSOCIATIVE PROCESSORS

by M. M. Lebedinskiy

Introduction

Until recently it seemed that the main factor for increasing computer productivity was to increase the speed of their component base. However, it is now felt when this speed is estimated as close to its maximum that the basis for this will be improvement of computer configuration and selection of this configuration according to the class of problems being solved. This selection will be mainly determined by the extent of the capabilities of performing parallel calculations [1]. In this regard much attention is now being devoted to parallel calculations. Thus, several multiprocessor systems [1, 2] already exist and are now operating and there are numerous technical developments [3, 4]. Mathematical models of parallelism have also been proposed [5-8]. Extensive literature has also been devoted to problems of the complexity of parallel calculations on one or another type of models.

A calculating model of parallel calculations is proposed in this paper and its capabilities are considered. This model is a three-dimensional associative parallel processor (APP_3) which is a generalization of associative parallel processors (APP) considered in [3, 9-11].

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BIBLIOGRAPHY

1. Myamlin, A. N. and A. A. Sosnin, "Super-EVM: arkhitektura i oblasti primeneniya" [The Supercomputer--Its Configuration and Areas of Application], No 15, Preprint, Institute of Applied Mathematics, Moscow, 1977.

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PROCEDURE FOR DETERMINING ECONOMIC EFFECTIVENESS OF AUTOMATED ENTERPRISE AND PRODUCTION ASSOCIATION MANAGEMENT SYSTEMS (ASUP)

Moscow METODIKA OPREDELENIYA EKONOMICHESKOY EFFEKTIVNOSTI AVTOMATIZIROVANNYKH SISTEM UPRAVLENIYA PREDPRIYATIYAMI I PROIZVODSTVENNYMI OB"YEDINENIYAMI in Russian 1979 signed to press 24 Apr 79 pp 2-4, 62

[Annotation, table of contents and introduction from booklet edited by Ye. A. Timofeyeva, USSR State Committee for Science and Technology and USSR Gosplan, Moscow, "Statistika," 45,000 copies, 62 pages]

[Text] Annotation

The given procedure has been prepared on the basis of "Procedure for determining economic effectiveness of automated enterprise and production association management systems," approved by resolution of the USSR State Committee for Science and Technology, the USSR Gosplan and the Presidium of the USSR Academy of Sciences and in accordance with the main positions of "Procedure for determining economic effectiveness of the use of new technology, inventions and rationalizers' proposals in the national economy." The procedure is obligatory for all sectors of the national economy.

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3.3. Calculation of One-time Expenditures on the Creation and Introduction of an ASUP 41

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Introduction

An automated enterprise and production association control system (ASUP) represents a management system with the use of contemporary automatic data processing technology (electronic computers, storage, registration and display devices, etc) and economic mathematical methods. It is meant for the solution of the main problems in the management of the productive and economic activity of enterprises and production associations. It is a man-machine system that assures the automated collection and processing of data necessary for optimization of management in different spheres of human activity [see All-Union State Standard (GOST) 19875-74].

The purpose of ASUP introduction is to increase the effectiveness of the production and economic activity of enterprises and production associations, expressed in increase of output, improvement of the quality of production needed by the national economy and reduction of production costs.

The creation of an ASUP requires one-time expenditures on its development, the acquisition of the necessary complex of hardware and on construction and installation work. Functioning of the ASUP is assured by current expenditures. The economic effectiveness of an ASUP is determined with consideration of the one-time expenditures and current expenditures.

The present Procedure for Determining ASUP Economic Effectiveness has been prepared on the basis of the Procedure for determining economic effectiveness of automated enterprise and production associated management systems, approved by resolution of the USSR State Committee for Science and Technology, the USSR Gosplan and the Presidium of the USSR Academy of Sciences dated 17 July 1975, No 379/86/34, and in accordance with the main positions of the Procedure for determining economic effectiveness of the use of new technology, invention and rationalizers' proposals in the national economy, approved by resolution No 48/16/13/3 of the USSR State Committee for Science and Technology, the USSR Gosplan, the USSR Gosplan, the USSR Academy of Sciences and the State Committee for Inventions and Discoveries dated 14 February 1977.

The procedure is obligatory for all sectors of the national economy and will serve as the basis for the development and approval by ministries and departments by agreement with the USSR State Committee for Science and Technology and the USSR Gosplan of sector methodical instructions taking into account distinctive features of calculations of ASUP economic effectiveness in sectors of the national economy and industry.

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The procedure and sector methodical instructions developed on the basis of it must be used in the ministries, departments, associations and enterprises and in sector scientific research and planning institutes in all stages of ASUP creation and introduction.

The procedure has been prepared by the Main Administration of Computer Technology and Control Systems of the State Committee for Science and Technology, the Section of Summary Planning and Introduction of Computer Technology into the National Economy of the USSR Gosplan and the Central Economic Mathematics Institute of the USSR Academy of Sciences under the supervision of comrades V. A. Myasnikov, R. L. Ashastin and N. P. Fedorenko.

Participating in the preparation of the Procedure were the following members of the Temporary Scientific and Technical Comission: comrades S. A. Abramov, T. M. Bodyanskaya, V. A. Burovin (scientific secretary), M. A. Vilenskiy, G. Ye. Bodolazhskiy, G. S. Guneyev, I. S. Zinger, L. I. Istomin, A. A. Komarov, I. A. Kruchinin, I. G. Kushayeva, D. S. L'vov, L. I. Maksimov, A. A. Modin (chairman), V. A. Pokrovskiy, A. Ye. Rozinkin, F. I. Rudnik, N. A. Sokolov, N. A. Solomatin, N. I. Cheshenko (deputy chairman), N.G. Chumachenko, G. A. Botvinko and M. F. Korotyayev.

The scientific leadership of the development of the Procedure was accomplished by comrades A. A. Modin, B. F. Zaytsev, D. S. L'vov and N. I. Cheshenko.

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PROGRAMMING IN SIMPLIFIED ALGOL

Moscow PROGRAMMIROVANIYE NA UPROSHCHENNOM ALGOLE in Russian 1978 signed to press 4 Nov 77 pp 2-4

[Annotation and foreword from book by Sergey Aleksandrovich Abramov and Igor' Nikolayevich Antipov, Computer Center, USSR Academy of Sciences, Izd. "Nauka," 25,000 copies, 182 pages]

[Text] Annotation

The subset ALGOL 60, that is, a simplified version of it, is discussed in detail in the book. Methods of programming in the simplified language are examined in detail on numerous examples. Besides purely computational tasks, much attention is given to problems of a logical nature. The book is intended for a wide circle of readers to provide initial acquaintance with programming in ALGOL 60. It can be used by VUZ students, programming instructors, programmers and scientific associates.

Foreword

In accordance with its name the book is devoted to a certain simplified variant of the language AlGOL 60. The simplification was reduced mainly to the removal of some concepts.

We set ourselves the task of providing not only certain information about ALGOL 60 but also of helping the reader to acquire basic habits of programming competence, economy of calculations, organization of sortings, etc.

It is not assumed that the reader has any sort of knowledge of areas of programming, computer technology or higher (non-school) mathematics.

The book is so constructed that at times the concept of language is given first in a very simple form and is refined only at the moment when according to our ideas the reader is prepared to master the concept completely. This was done to draw the reader very rapidly toward the independent and sensible compilation of completed programs. In addition, this is the usual method of teaching natural languages.

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We hope that the reader who has studied only part of the book (containing the first four sections) will feel that the time has not been wasted, as he already will be able to compile some simple programs.

The account is presented as much as possible in such a way that each new section adds something complete. An exception is section 11--in essence it forms a whole unit along with section 12.

Chapter 1 is devoted to description of a part of ALGOL 60 not containing concepts of procedure and logical expression. Its contents can be regarded as an independent variant of the ALGOL 60 language. This variant is expanded only in Chapter 3; at first it is supplemented by the concept of procedure and later by the concept of logical expression.

The methods and programs for the solution of problems (examples and answers to exercises) presented in the book are as rational as possible, but do not claim to be the best. In a number of cases the reader can present another solution of the problem.

We started from the conviction that the study of any language (including a programming language) is unthinkable without a large number of examples and independent exercises. However, following that conviction would bring the volume of the book beyond the limits which seemed natural at the start of the work.

In preparing the test, part of the material was borrowed from our book "Algoritmicheskiy yazyk ALGOL 60" ("The Algorithmic Language ALGOL 60"), Moscow, Izdatel'stvo "Prosveshcheniye," 1975.

The book was written on the basis of experience in teaching programming to students of the senior classes of school No 52 of Moscow. The book's contents were affected by exchanges of opinions with other instructors--mainly associates of the USSR Academy of Sciences Computer Center. Besides that, we constantly made use of consultations and advice of A. A. Abramov, V. M. Kurochkin, N. M. Narodnyy and V. D. Podderyugin. Important and interesting suggestions and comments regarding both the selection of material and the style of the account were made by Corresponding Member of the USSR Academy of Sciences S. S. Lavrov. N. B. Petrukhina, senior editor of the MGU scientific library, rendered much help in preparing the manuscript for the press. We express our sincere gratitude and thanks to all those persons.

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RAPID INFORMATION IS IN AUTOMATED GAS PIPELINE MANAGEMENT SYSTEMS

Moscow OPERATIVNAYA INFORMATSIYA V ASU MAGISTRAL'NYKH GAZOPROVODOV in Russian 1979 signed to press 3 Jul 79 p 2

[Annotation from book by Boris Leonidovich Kuchin, Izd. "Nedra," 1500 copies, 216 pages]

[Text] Annotation

The author examines rapid dispatcher information, which serves as the basis for the solution of tasks of rapid control and monitoring of the conditions of gas pipelines. The role of dispatcher information grows considerably in connection with the introduction of computer hardware on gas pipelines and the creation of automated control systems. Methods of processing rapid dispatcher information are presented, and algorithms for the solution of operational technological problems in gas pipeline ASU's. Special attention is given to recording errors in operational dispatcher measurements and the application of methods of adaptation and teaching to correct them. The discussion of the problems has a practical character and is illustrated by examples of calculations for real gas pipelines of the USSR. The book is intended for a wide range of specialists engaged in the planning, operation and management of complex systems of distant gas transportation, and also for students of VUZ's with an oil and gas profile.

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SOFTWARE FOR LONG-RANGE INDUSTRIAL PLANNING

Novosibirsk MATEMATICHESKOYE OBESPECHENIYE PERSPEKTIVNOGO OTRASLEVOGO PLANIROVANIYA in Russian 1979 signed to press 5 Oct 79 pp 2, 3-5, 25-27, 270-271

[Annotation, foreword, excerpts and table of contents from book by Sergey Matveyevich Antsyz, Valeriy Leonidovich Makarov, Valentin Davydovich Marshak and Vitaliy Fedorovich Fefelov, Izd. "Nauka," 2300 copies, 272 pages]

[Text] UDC 658.012.011.56 + 658.152 (104) The monograph describes the basic principles for designing software systems for long-range planning in an industrial sector -- a basic version of a system "Long-range planning of industrial sector." It makes it possible to design plans for the efficient utilization of available production capacities and to introduce new ones according to the resources provided by the sector and the national economic requirements for its products.

The monograph is intended for mathematicians and economists who develop high level automatic control systems.

Tables 35. Illustrations 5. Bibliography contains 23 items.

Introduction

Automating national economic planning and control is among the most important problems faced by science and engineering at the modern stage of economic development. Its satisfactory solution will make it possible to pursue a policy of conscious optimization for utilizing the labor and raw material resources of the country. Experience shows that the problem of automating planning and control processes is very complex, mainly because its solution requires combining the results obtained in various fields of science, preparing an adequate technical base and management apparatus for utilizing methods for adopting decisions with automation components, as well as studying legal and organizational problems of utilizing automatic control

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The basic aim of this monograph is to describe the experience in developing systematic software of planning and control processes on the concrete example of the "Long-range planning of development of an industrial sector" subsystem of a sector automated control system (OASU) -- an ASU "Pribor II" for the Ministry of Instrument Building, Automation Facilities and Control Systems (Minpribor). This OASU was accepted for industrial operation by the government commission in 1975, and experience in operating it has now been accumulated. It is the leading system for machine building and metal working sectors.

The software system (model, algorithm and program) for the "Long-range planning" subsystem was developed by the Mathematics Institute of the Siberian affiliate of the AN USSR. As a whole, this subsystem was created by the cooperation of three organizations: the Minpribor Scientific Research System Institute [NIIsistem] (Novosibirsk), the Gipropribor [Government Institute for Designing Instrument Building Plants] (Leningrad) and the Mathematics Institute of the Siberian affiliate of the AN USSR (Novosibirsk) under the general guidance of the VNIPI [All-Union Scientific Research and Planning Institute] OASU Minpribor (Moscow) and workers of the ministry apparatus.

At present, the described subsystem is being developed further in the "Instrument building" sector, as well as in other sectors of machine building.

This monograph briefly describes the models and algorithms of the functioning of industrial sector systems on which corresponding softwares are based. Economic-mathematical problems related to the optimal functioning of the systems of the industrial sector, in particular, to the design of long-range plans, are considered in detail by two of the authors in a book [6].

It should be noted that any concrete solution of the program adopted in the subsystem should, as a rule, be considered one of acceptable versions. The possibility of other versions is indicated in a number of cases in the text.

The authors hope that the reader will see the common nature beyond the concrete systems described, the basic direction, the principles and typical situations that originate in creating software programs for systems oriented toward solving problems of planning and control, using optimization models and methods, which will aid him in developing and operating similar systems.

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systems (ASU). At present, the process of creating, introducing and operating ASU spans practically all spheres of the national economy. This is the result of great activity of various organs on the implementation of the directives of the 24th and 25th party congresses.

The appearance of ASU is unavoidable because of the necessity of collecting and processing a rapidly increasing flow of data. The ASU of the first stage span data collection processes, the simplest processing and the issuing of the output data in necessary forms. The basic operations and algorithms here are: recording primary data on machine carriers and algorithms for sorting data and printing output documentation. Problems originating in creating such systems are described widely in literature, especially, in [1 - 4] . Many ASU of the first stage have already been operating efficiently for many years. However, their efficiency, as a rule, is not as great as some developers thought it would be. Actually, an especially high efficiency should not be expected from the ASU of the first stage. They are important not so much in themselves, as much as for a basis for a most perfect ASU of the second stage, which use essentially more complex mathematical algorithms. Moreover, the efficiency of the first stage ASU is reduced, as a rule, by the weak technical and organizational provision of a very complex operation: the organization of collecting and recording primary data on machine carriers (punched cards, magnetic tape). This is related partially to the small variety and insufficient amount of peripheral devices for introducing data such as, for example, displays.

Considerably less experience was accumulated in problems of developing and, especially, of operating ASU of the second stage [5]. These ASU are distinguished primarily by the fact that they include some algorithms for adopting decisions. I.e., here is a system that not only prepares data for adopting decisions, but also assumes some functions for adopting decisions. There are various methods for adopting decisions. Their most important part is optimization logarithms. The latter make it possible to select the best version of a solution by some criterion from among a very wide multitude of possible (conceivable) versions. Because of this, a version of a solution may be found that would never have entered the mind of a person who adopts a decision on the basis of general considerations and past experience. Moreover, in some situations, to select an optimal version, it is necessary to take into account so many factors that one person would be unable to handle them.

This monograph is one of the first dedicated to providing algorithm and program software for the second stage ASU -- ASU with automation components (particularly optimal) for adopting decisions. Therefore, its basic attention is devoted to system organization, first, of calculations using optimization algorithms and, secondly, to providing data for them.

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In conclusion, the authors take this opportunity to express their appreciation to staff workers of the Mathematics Institute of the Siberian affiliate of the AN USSR, L.N. Krylova, I. V. Donskov and A. N. Kozyrev, who are actually coauthors of the program system described here. The authors are also grateful for guidance by the Minpribor, the collectives of the NIIsistem (Novosibirsk), the Gipribor (Leningrad) and the VNIPI OASU (Moscow) whose fruitful cooperation made this book possible. The authors wish to note, especially, A. N. Velikotskiy, A. Ye. Gel'man and A. I. Sokolovskiy (NIIsistem), A.V. Zil'ber, S. A. Kuznetsova (Gipribor), L. D. Podval'nyy, V. Ye. Koretskiy (VNIPI OASU).

The OPTIMUM system provides (local) optimization in preparing a plan by means of linear programming procedures, as well as other algorithms (discrete programming, sorting, etc.). The INFORM, VARIANT, MATRITSA and DOKUMENT systems in the aggregate make it possible to optimize the plan further in any of its parts by developing and introducing additional data. An analysis of the output data of the obtained plan version contained in the forms of the DOKUMENT system, indicate the direction for making the initial data more precise.

The basic data on the production possibilities of enterprises is included in the description of the allowable versions of their development. When the version in the plan does not satisfy the user for some reason, he can request the preparation of a more acceptable version and introduce it into the initial data for the OPTIMUM system. The corresponding software makes it possible to do so rapidly and simply. After the plan is recalculated in the OPTIMUM system, the procedure described for renovating data can be repeated. Thus, the volume and boundaries of the initial data are not fixed rigidly and the process of plan calculation contains a comprehensive analysis and the possibility of preparation of additional data by the user. Therefore, the very concept of the optimal plan should be understood by taking into account this nonformalized and, apparently, nonformalizable factor.

The INFORM system consists of programs that implement the introduction of initial data files and put it in a form convenient for following calculations. The programs of this system also organize the operation of the data file of the entire system. The data file includes various dictionaries and classifiers and files of norm-reference data. Monitoring is implemented here of the correctness of data input according to different indicators. Several modes of data input exist that make it possible to renew files and add new data fairly simply.

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The VARIANT system combines programs for calculating the techno-economic indicator system for forming the variations in the development of each enterprise involved in the solution of the optimization problems. The purpose of this system is to generate development variations of each enterprise on the basis of special methods for calculating the indicators, adopted in the planning institute practice. The system programs include methods for calculating indicators in accordance with existing enterprises, those being built and planned, which are actually used by the Gipropribor (Leningrad) in creating corresponding projects. The number of variations considered for each of the enterprises is not fixed beforehand, but is determined by the user of the system.

The MATRITSA system consists of programs forming matrices and vectors of limitations for the problems being solved in the OPTIMUM system. Variations are possible in the process of the operation of the MATRITSA system which is related to the fact that data needed for associations may be prepared in a different order.

The final DOKUMENT program system includes a library of documents of output forms (see addendums), as well as a program for requests for necessary data files forming, with their help, corresponding plan documents and their output by the printing devices. These documents are intended for use at different levels of management and planning activity: at the highest management level of the ministry, the planning-economic administration of the ministry, the planning departments of all-union production associations, etc. Therefore, the software system prepares various modes of document output that make it possible to obtain every time only those documents that are needed in a given case.

The basic variation of software for the "Long-range planning of industrial sector development" system described below is still far from being perfect as a model of economic system functions; nevertheless, it is the first model of a system for industrial sector functioning in the sense that it is put here in terms of the "functioning model." In general, in the functioning mode represented by the given variation, not all processes are equally automated. Automated processes of optimizing the plan are in it and processes that provide for a tie between the optimization unit and the constantly supplemented initial data. As far as the process of checking the prepared plan for its degree of correspondence to conditions and aims of the executors is concerned, it is not fully automated and must be implemented partially manually. The absence, in the described variation, of a formal model which initiates the process of implementation of theplan prepared in the optimization unit, is compensated for by the possibilities of the "Dialog" mode. Specific limitations of concrete plan executors related, for example, to existing management methods, local conditions, traditions in a given territory, etc., are

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taken into account in the initial model for plan implementation. Such limitations are impossible to introduce into the optimal planning model because they cannot be expressed in the form of a system of inequalities. They also cannot be taken into account in the initial data in the form of corresponding corrections to some coefficients and norms. In the existing variation of this kind, the limitations are monitored manually by the user. For example, the user knows that a given enterprise lacks certain categories of workers. Therefore, he does not permit variations of the calculated plan for developing the given enterprise that include a high requirement of workers in such categories. Manual monitoring in the part of imposing all kinds of additional limitations is not free of shortcomings, of course; however, its advantage is in the fact that in this way it is possible to utilize the rich experience of the planning workers -- the system users. In conclusion, we will note that inasmuch as the "Long-range planning of development of an industrial sector" system is now in the process of operation at the Minpribor, individual questions and factors are identified at times which are not taken into account in an automated system. Therefore, the system is being improved constantly and supplemented by new programs and modes and, in a word, is evolved. However, its basic frame remains unchanged.

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THE VOLZHSKIY MOTOR-VEHICLE PLANT AUTOMATED CONTROL SYSTEM--ASU VAZa

Moscow AVTOMATIZIROVANNAYA SISTEMA UPRAVLENIYA VOLZHSKIM AVTOZAVODOM in Russian 1979 signed to press 23 Jan 79 pp 2, 28, 76, 77

[Annotation, table of contents and excerpts from book by Yuriy Nikolayevich Perevalov, Vladimir Ivanovich Tikhonov and Boris Pavlovich Lomonosov, Moscow, Izd. "Mashinostroyeniye," 5,300 copies, 77 pages]

[Text] Annotation

The booklet describes experience in the creation and introduction of an automated enterprise management system (ASUP) for enterprises with a mass and large-series character of production, presents the principles of construction of the system, describes the principal ASUP subsystems, characterizes the effectiveness of the system and designates the paths of its further development. The booklet is intended for the engineering and technological workers of machine-building enterprises, scientific research institutes and planning organizations engaged in ASUP creation and introduction.

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[Excerpts]

The ASU VAZa hardware includes nine General Electric computers: 3 GE-425 systems, 2 GE-130 systems and 4 GE-115 systems, a complex of traditional equipment (8 perforators, 3 verifiers, 4 punchcard decoders, 2 reproducers and 2 collators and over 400 peripheral devices.

The creation of the ASU VAZa was envisaged on the basis of a complex of Soviet-produced hardware. Taking into account that the existing ASU is functioning on the basis of General Electric computers, the stocks of which have been completely exhausted, the problem of their program and hardware compatibility with Soviet-produced computers must be solved with a gradual transition to the latter.

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YEARBOOK OF JOURNAL ARTICLES CONCERNED WITH COMPUTER TECHNOLOGY

Moscow LETOPIS' ZHURNAL'NYKH STATEY in Russian No 4, 1980 signed to press 3 Mar 80 pp 36-40

[Excerpts from the collection edited by V. S. Privalova, Izdatel'stvo Kniga, 409 copies, 40 pages]

[Text] 5022. Volkovyskiy, V. L. and N. N. Kalev, "Modelling Digital Devices on Small Computers," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 24-29. Five references.

5023. Volkogonov, V. N., "Storage Devices in Devices for Coding Cyclic Codes," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 114-119. Five references.

5024. Glinkov, A. S. and P. N. Mel'nikov, "Analysis of the Effect of Technical and Algorithmic Parameters on the Efficiency Indicators of Software in Realization of One Type of Algorithms on a Digital Computer," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, no 6, 1978, pp 103-107.

5027. Gryuneberger, G. and V. N. Volkogonov, "Some Aspects of Developing Microprocessor Controllers of External Storage Devices," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 127-133.

5029. Drozdov, G. P., "Optimization of the Parameters of Measuring Converters Being Designed for Integrating Devices," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 85-88.

5032. Mayorov, V. G. and F. M. Shlykov, " Specialized Pulse-Analog Phase-Type Device for Calculation of Direct and Inverse Trigonometric Functions," SPETSILIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 57-61.

5035. Marin, A. V. and V. I. Skorubskiy, "Microprogramming Languages and Their Structural Interpretation," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 33-38.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

5037. Medvedevskikh, V. A., "A Machine Algorithm and a Program for Minimization of Boolean Functions Given By Cubic Complexes for the Nairi Computer," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 21-24.

5038. Musayev, M. M. and V. B. Smolov, "Synthesizing the Structure of Quadratic Multifunctional Converters Based on Orthogonal Series," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 49-57.

5040. Ognev, I. V. and G. A. Borodin, "Prospects for Developing Semipermanent Stores for Digital Computers," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 107-111.

5043. Reznikov, A. G. and S. V. Kulikov, "A Multichannel Random Signal Generator for Computers," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 88-93.

5044. Sarychev, K. F., "Investigating the Structures of the Memory Modules of Semiconductor Internal Storage Devices With Increased Reliability," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 111-114.

5046. Smolov, V. V., "Determining the Effectiveness of Adaptive Digital Quantification," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 45-48.

5049. Solovov, P. V., "Determining the Dynamic Error of a Periodic Frequency Converter to a Digital Copying Code," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 78-80.

5050. Surzhenko, I. F., "Analyzing the Frequency-Accuracy Parameters of Numerical Integration Methods," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 120-122.

5054. Yusim, G. V. and V. S. Gorin, "Configuration of Circuits Containing 'Different Size' Base Components," SPETSIALIZIROVANYYE I KOMBINIROVANYYE VYCHISLITEL'NYYE USTROYSTVA, No 6, 1978, pp 120-122.

12386. Kartseva, N. S., "The Configuration of a Service Program Complex for the Setun'-70 Machine," VYCHISLITEL'NAYA TEKHNIKA I VOPROSY KIBERNETIKI, No 16, 1979, pp 44-47.

12387. Kovalev, A. D. and G. M. Kunyanskiy, "A Method of Transmitting Start-Stop Packs Using the Procedure for Establishing Conformity and Its Application for Communication of Simple Terminals With The BESM-6 Computer," VYCHISLITEL'NAYA TEKHNIKA I VOPROSY KIBERNETIKI, No 16, 1979, pp 196-206. Five references.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200090029-9

12396. Alverez, Kh. Ramil' et al, "An Operational System for the Small Setun'70 Digital Computer," Kh. Ramil' Alvarez, G. A. Kiselev and Yu. Yu. Galimov, VYCHISLITEL'NAYA I VOPROSY KIBERNETIKI, No 16, 1979 pp 20-30.

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