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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 27

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

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I. DEVELOPMENT AND PRODUCTION OF COMPUTERS AND CONTROL EQUIPMENT

A. General Treatment

USSR

GLUSHKOV DISCUSSES COMPUTERIZED FORECASTING OF SCIENTIFIC PROGRESS AND NOTES DEVELOPMENT OF SPECIAL COMPUTER

Moscow KOMSOMOL'SKAYA PRAVDA in Russian (Russian ("Science Controls Science"))
21 Dec 76 p 2

GLUSHKOV, V. M., academician, director of the Institute of Cybernetics, Academy of Sciences Ukrainian SSR

[Abstract] Professor V. M. Glushkov reviews the problem of forecasting and planning scientific progress, and makes some proposals for improving it based on the experience of his own institute.

Recently the Institute of Cybernetics and East German specialists developed a computer-based method of 'machine forecasting' which is suitable for all the CEMA member countries. In this method, scientists determine what sort of concrete scientific advances will be required for a given period in the future, and the computer plots a branching diagram outlining the ways, including sub-goals and sub-tasks, by which the advances can be realized. Glushkov stresses the flexibility of forecasting and planning with computers, which can instantly adjust plans to account for new developments.

Glushkov suggests that it is essential to apply this method of forecasting in the solution of all major scientific-technical problems of the national economy. Citing the slow implementation of scientific-technical achievements in production, he proposes a close dovetailing of economic planning with forecasting scientific development and increased plan flexibility through use of computers. He says that such a method has been developed at his institute, making it possible to quickly correct and re-balance comprehensive plans for major sectors of the economy.

Among other suggestions, Glushkov proposes that the future State Information Center establish a 'problem bank' which would store clearly formulated and systematized current tasks and problems of science and the economy.

Glushkov urges wide use of computers in the automation of large-scale experiments to significantly simplify the 'technology' of scientific research. He says his institute has developed a small and comparatively inexpensive computer for just this purpose.

USSR

FUTURE COMPUTERS WILL PROCESS VISUAL IMAGES

Moscow ZNANIYE-SILA in Russian ("What Does the Machine 'Like'--Numbers or Patterns?") No 1, Jan 77 pp 17-18

RUVINSKIY, I.

[Abstract] Computers are said to be still in their youth. Like a three-year-old child, a modern computer must be taken by the hand and guided step by step through its operating program, written in an extremely simple language which the computer, like the three year old, can understand. In the future, however, computers will "mature" and learn to recognize patterns in what amounts to a much more complex language--the language of visual images. Photoelectronic tracking devices or "eyes" will allow the computer to take in information in a much more complex form and to perform operations in the laboratory and on the production line much closer to the types of operations performed by human beings today.

POLAND

"GEORGE-3" OPERATING SYSTEM FOR POLISH ODRA COMPUTERS

Warsaw INFORMATYKA in Polish No 4, April 1976 pp 5-6

JELINSKI, ROMAN, Institute of Electronic Computing Technology, Gdynia

[Abstract] A further development of the production of the ODRA 1300 series computers is being planned in the next five-year plan. A preliminary plan worked out by the Information Science Committee proposes to install in Poland about 100 ODRA 1305 computers with operating storage capacity of 128 k and with disk store of 60 MB or 60 MB capacity, a part of these installations working under multi-access conditions. In the Information Science Association about 17 ODRA 1305 computers have been already installed and in the next five-year plan it is intended to put into operation another 25 installations based on ODRA 1305 computers equipped with high-speed disk store (30 or 60 MB) and drum store; six of these installations will work under multi-access conditions. It is also planned to build an experimental tele-information network based primarily upon Polish hardware. In ZETO of Gdynia a large multi-access installation based on an ODRA 1305 computer with an ICL 2xEDS60 disk store, a PB-304 Polish drum store and a scanning system is also being built. Experience in using ODRA 1305 computers with an operating storage above 64 k showed that the ICL George (G3) operating system is a suitable system for these installations. Use of the G3 is especially effective wherever computers are faced with a great diversity of tasks. The author discusses organizational, technological and cadre-training problems involved in the implementation of the system.

Roman Jelinski, M.A., Eng., is a graduate of the Department of Computers, Moscow Institute of Power Engineering (1967). He works in ZETO [Electronic Computing Technology Plant], Gdynia (1967), and is at present the Head of the Operating Systems Laboratory.

POLAND

THE USE OF A SOFTWARE MONITOR IN MEASUREMENT AND EVALUATION OF COMPUTER SYSTEMS

Warsaw INFORMATYKA in Polish No 4, April 1976 pp 15-18

MALECKI, KRZYSZTOF, Department of Computer Systems, Information Science Research and Development Center, Warsaw

[Abstract] The article analyzes the pertinent Western literature concerning use of a software monitor in the measurement and evaluation of the operational parameters of computer systems. This analysis is a preliminary stage in the work on the above subject carried on by the Laboratory for the Measurements and Evaluation of the Effectiveness of Computer Systems at

the Information Science Research and Development Center. The information obtained can be used to improve the parameters and increase the effectiveness of the computer system under investigation. The following methods were examined: hardware methods, software methods and theoretical methods (modeling and simulation). The software methods examined include the intercept technique (coupled with the use of load and control monitor) and sampling technique. The author also analyzes the structure and operation of the software monitor designed by the Department of Information Science of the Washington University, which was used in the evaluation and analysis of the work of the IBM-360/65 computer. Figures 4; references 6 (Western).

Krzysztof Malecki is a graduate of the Department of Electronics, Warsaw Polytechnic (1974). He works in the Information Science Research and Development Center [OBRI] as Designer, and now as Assistant. He participated in putting into operation ROBOTRON 21 computer in OBRI (at present in IOK). He takes part in the work on monitoring computer systems and designing a hardware monitor which is carried on by the Laboratory of Measurements and Evaluation of the Effectiveness of Computer Systems at OBRI.

B. Problem Areas

USSR

EFFICIENCY OF COMPUTER INTRODUCTION AND USE CRITICIZED

Moscow PRAVDA in Russian ("Surprises' of the Electronic Machines") 2 Mar 77 p 2

RAKOVSKIY, M., deputy chairman of Gosplan USSR

[Abstract] In this article, Chairman Rakovskiy makes some strong, specific criticisms regarding the efficiency of operation of computers in the Soviet economy. If one were to ask workers of computer centers how things stand with operating efficiency of computers, Rakovskiy observes, the answers would be contradictory and inaccurate. Rakovskiy says that the fact is that there are no reliable methods for calculating the efficiency. It is suspected that the efficiency of operation of computers in the country on the whole is poor, with an average operating time of only 12-14 hours daily. Rakovskiy says that depending on which programs are used in solving a problem, the time for solving the problem can take 30 minutes, or it can take five hours. The USSR Central Statistical Administration's methodology for determining operating efficiency now serves as the guideline, and Rakovskiy says that it needs to be improved.

Rakovskiy distinguishes three 'serious difficulties' in the way of improving efficiency of computer operation. The first is an acute shortage of modern peripheral equipment. The assortment which is produced is far from adequate. Rakovskiy says that the ministries which manufacture computers (the Ministry of the Radio Industry and the Ministry of Instrument Building, Automation Equipment and Control Systems) are not very much concerned that efficiency of computers is diminished by the lack of peripheral equipment. The second problem is that production of computers is handled by different ministries. Rakovskiy charges that they have a poor record of observing the coordination plans which are supposed to ensure a unified technical policy. Thirdly, the ministries which manufacture computers are interested in prolonging production of the same machines as long as possible ("like all other branches of the economy," Rakovskiy adds), with little concern for their modernization.

Rakovskiy states that there are many examples of slow implementation of very important computer technology. The Ministry of the Radio Industry delayed development of the large computers "YES-1050" and "YES-1060" for three years. Twenty large computer time-sharing centers were supposed to have been organized in the last 5-year plan, but not a single one has been created. The Ministry of Instrument Building, Automation Equipment and Control Systems delayed the development of a family of minicomputers. Because of this, many agencies were forced to organize production of minicomputers on their own. The Ministry of the Electronics Industry was two years behind its schedule for supplying integrated circuits for third-generation computers, and the Ministry of the Electrical Equipment Industry was late in supplying special motors.

Among other criticisms made by Rakovskiy are that labor productivity of computer programmers is growing slowly, methods for compiling programs for the most part are obsolete, and mathematical science is not doing enough to improve programming methods.

Rakovskiy cites some figures regarding computer production and operation. In the Soviet Union and other member countries of CEMA, more than 80 plants and corporations are engaged in production of computer technology. They employ more than 300,000 workers. A similar number of persons work on the operation of existing computers. Rakovskiy observes that it is hoped that the number of persons working in computer centers shall not grow in the future: the efficiency of computers must be increased through their technical improvement, creation of computer time-sharing centers, and use of progressive programming methods.

USSR

REPLY TO COMPLAINT ABOUT INEFFICIENT USE OF COMPUTERS IN OMSK

Moscow SOVETSKAYA ROSSIYA in Russian ("Being Solved in a Comprehensive Manner") 24 Dec 76 p 2

[Summary] This article gives the reply of V. Myasnikov, head of the Main Administration for Computer Technology and Control Systems of the State Committee for Science and Technology, to an earlier article in the newspaper Sovetskaya Rossiya (6 Oct 76, p 2) which revealed inefficient utilization of computers at industrial enterprises in Omsk.

Myasnikov replies that the article was correct in pointing out the problem of improving the efficient utilization of computers. A broad program has been outlined and is being put into action to solve this problem. The program calls for the development of ASU's [automated management systems] at base enterprises, and then widespread dissemination of their advanced experience. The ASU's are being created on the basis of modern computer technology, using economic-mathematical methods, standardized design solutions, and packages of applied computer programs. Use of standardized design solutions will help to reduce the time needed to develop ASU's by 20-40 percent. Measures to insure programming compatibility between diverse computers have also been taken.

Myasnikov also agrees with the article on the need for computer time-sharing centers, and says that six of these centers will be organized during the current five-year plan.

C. Production Plants

USSR

PHOTO CAPTION

Riga SOVETSKAYA LATVIYA in Russian 24 Dec 76 p 2

Belorussian SSR. Socialist competition to raise the efficiency of production and improve the quality of output has spread extensively throughout the Minsk Production Association of Computer Technology. A great deal of work is being done in the Association's enterprises to improve technology and introduce new equipment. A comprehensive system of quality control has been developed and is now operating. Peoples control posts and raid brigades headed by communists have been established in all subdivisions. The number of workers and even whole sections who submit their output from the first appearance to the OTK [Technical Control Division] is steadily growing.

The photograph was taken at the Association's main enterprise, the Electronic Computer Plant imeni G. K. Ordzhonikidze. The photo shows Assembly-Wiring Workshop No 2, where an automated control system, which was introduced for wiring the Minsk-32 computer and was awarded a State Mark of Quality, is now being used to supervise the technological process of wiring the YeS-1022 computer. In the foreground are shock workers of communist labor Ye. D. Petrovich, senior engineer-mathematician, and P. L. Fedorchuk, engineer-electrician. [Source of photograph (identical to the photo which accompanied the article): SOVETSKAYA ESTONIYA, 21 Dec 76, p 1]



USSR

COMPUTER REPAIR PLANT ESTABLISHED IN SARATOV

Moscow PRAVDA in Russian ("Where Computers are Repaired") 6 Jan 77 p 2

VOROTNIKOV, A., correspondent of PRAVDA

[Excerpt] Saratov. A plant for the repair of computer equipment has been established here. The staff of the enterprise has been charged with servicing computers, performing guaranteed repairs, installing computers and putting them into operation. The plant will serve the oblasts of the Volga region. In Saratov alone agreements have been concluded with 180 organizations for technical maintenance of 6000 computers.

USSR

MORE ON COMPUTER REPAIR PLANT IN SARATOV

Moscow IZVESTIYA in Russian ("A Hospital for Computers") 22 Jan 77 p 5

OVCHAROV, M.

[Text] Saratov. A plant for the repair of computer equipment has been established here. Its goal is the installation, adjustment, technical maintenance, and restoration of various computers in the enterprises and organizations of the Saratovskaya, Volgogradskaya, Kuybyshevskaya, and Penzenskaya Oblasts. The establishment of this specialized plant permits a significant increase in the effectiveness with which electronic computer equipment is used and reduces expenditures for its operation.

USSR

SERIES PRODUCTION OF ANALOG COMPUTER COMPLEXES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("The Complex Models the Experiment") 22 Dec 76 p 2

KAZAKOV, V., special correspondent of SOTSIALISTICHESKAYA INDUSTRIYA, Kishinev

[Text] The Kishinev Calculating Machines Plant imeni the 50th Anniversary of the USSR has begun series production of new continuous-action analog computer complexes.

They are distinguished from the model previously produced by a more advanced system of data verification, and they can operate independently or in conjunction with a computer. With the aid of the new complexes it will be possible to model and carry out diverse "experiments" without having recourse to real conditions. The machine can "suggest" the best variants for the solution of an entire series of scientific research and practical problems.

USSR

AL'FA ASSOCIATION WILL MANUFACTURE EXPERIMENTAL MODELS OF POCKET CALCULATORS

Riga SOVETSKAYA LATVIYA in Russian ("A Computer in the Pocket") 2 Dec 76 p 4

SLOTIN, V.

[Abstract] Workshop No 8 of the "Al'fa" Industrial-Technical Association will begin to manufacture experimental models of an engineering calculator at the beginning of the new year, 1977. The calculator will be able to perform addition and subtraction of two 8-digit numbers in 0.05 seconds and multiplication and division in 0.3 seconds, displaying a total result of 100 million. The calculator will also be able to raise numbers to a power, (1 second), extract roots, and compute logarithms, antilogarithms, trigonometric functions, and many others. According to V. Gusev, director of the Special Design-Technological Bureau for the Development of Consumer Products [bytovyye izdeliya], its memory contains the number "pi" and this value can be introduced into any computation merely by pressing a button. Furthermore, when computing trigonometric functions of angles, by moving a small switch, one can obtain the answer in either degrees or radians. The calculator is only slightly larger than a package of cigarettes and can be powered by an electrical network or by batteries. Its main operating part is a large integrated circuit.

USSR

FIRST CONSIGNMENT OF DRAFTING AUTOMATONS MANUFACTURED

Moscow TRUD in Russian ("A Translator for the Computer") 4 Mar 77 p 2

[Abstract] The first experimental consignment of machines intended to automate drafting and design work and the preparation of raw data for programs for machine tools with numerical control was output recently by the "Orgtekhnik" Plant in Yaroslavl'.

These coordinate-scanning and coding machines, named "Grafodat-R," can be thought of as translators which convert drawings and sketches from graph form into the form of papertape which can be fed into a computer.

D. Unified System of Ryad Series

USSR

YES-1035 TO BE PRODUCED IN SERIES

Riga SOVETSKAYA LATVIYA in Russian ("Around the Native Land") 6 Jan 77 p 1

[Excerpt] A new computer, the YeS-1035, which was created by specialists of the Minsk Scientific Research Institute of Computers, has successfully undergone testing. A State Commission has signed an act putting it into series production.

The new model is an addition to the "family" of computers which is being created jointly with specialists from Bulgaria, the GDR, Poland, and Czechoslovakia. It is based on integrated circuits, which ensures high operational indices. The design of the new model will allow extensive use of advanced technological processes during series production.

The new model is also supplied with an automatic diagnostic system, which makes it possible to significantly reduce its debugging time.

USSR

SERIES PRODUCTION OF YES-1035 APPROVED

Baku VYSHKA in Russian ("Recommended in Series") 6 Jan 77 p 3

[Text] Minsk. The new YeS-1035 computer, created by specialists of the Minsk Scientific Research Institute of Electronic Computers, has successfully undergone testing. The State Commission signed the act authorizing its production in series.

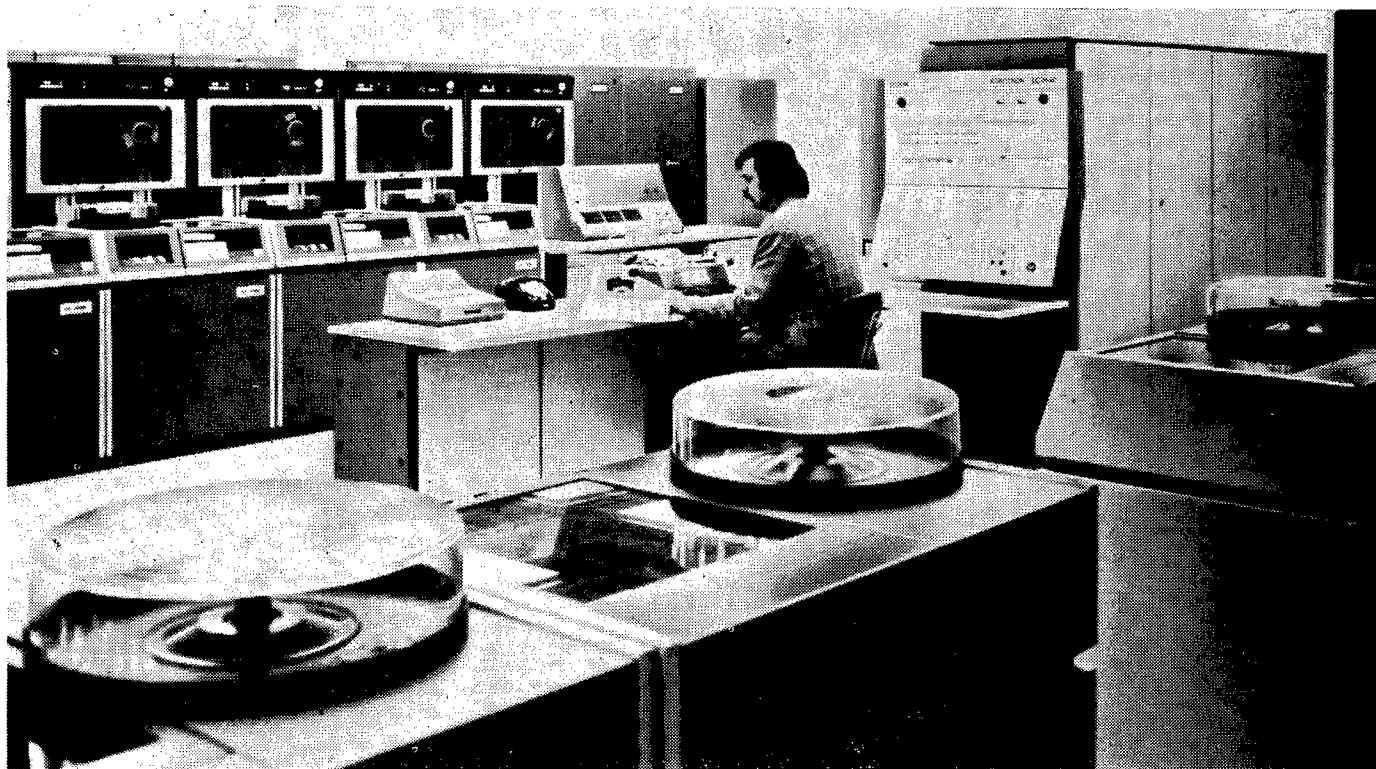
The new model is an addition to the "family" of computers which is being created jointly by specialists of Bulgaria, the GDR, Poland, and Czechoslovakia. It is made from integrated circuits, which ensures high operational indices.

The new model is provided with an automatic diagnostic system which makes it possible to significantly reduce the time needed to adjust the machine. It is capable of up to 200,000 operations per second.

USSR

Moscow MEKHAIZATSIIYA I AVTOMATIZATSIIYA PROIZVODSTVA in Russian No 5, 1976
inside back cover

[Abstract] An advertisement for the Robotron Corporation featured the following photograph of the Robotron YeS 1040 computer.



USSR

STANDARD PROGRAMS FOR PRINTING AND INPUT OF INFORMATION FROM PUNCH CARDS FOR
YeS SERIES COMPUTERS

Moscow STANDARTNYYE PROGRAMMY PECHATI I VVODA INFORMATSII S PERFOKART DLYA
EVM SERII YeS (INSTITUTE OF APPLIED MATHEMATICS, ACADEMY OF SCIENCES USSR)
in Russian 1975 27 pp

BETELIN, V. B., and ROMANYUK, S. G.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9 1976 Abstract No 9V832K from
the annotation]

[Text] A description is presented of the characteristics and capabilities
of standard print and punch card input programs intended for use in computers
with instruction systems similar to the YeS standardized series of computers.
The programs operate with the YeS operating system, YeS disc operating sys-
tem, and ASVT operating system; they can also be adapted for operation with-
in the framework of any operating system in which there is a set of data
control programs.

USSR

USE OF SOFTWARE FOR REMOTE DATA PROCESSING IN THE YeS COMPUTER OPERATING
SYSTEM FOR THE CONSTRUCTION OF TIME-SHARING SYSTEMS

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA [DATA PROCESSING ON
THIRD GENERATION COMPUTERS---COLLECTION OF WORKS] in Russian 1976 pp 12-19

DANILOCHKIN, V. P.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9 1976 Abstract No 9V839]

[Text] A study is made of remote processing of data in the YeS computer
operating system considering the place which it occupies in the solution
of the general problem of construction of time-sharing systems based on
the YeS series of computers.

USSR

MODELING OF COMPUTER INSTALLATIONS IN THE UNIFIED SYSTEM OF COMPUTERS BY
MEANS OF EVENT TRAJECTORIES

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA [DATA PROCESSING ON
THIRD GENERATION COMPUTERS--COLLECTION OF WORKS] in Russian 1976 pp 3-11

GAGARIN, A. P., and GRABOVSKIY, M. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9 1976 Abstract No 9V682]

[Text] A study is made of the experience gained in developing an imitation
model for investigation of computer installations in the Unified System
of Computers.

E. Hardware

USSR

SERIES PRODUCTION OF FOURTH-GENERATION NAIRI-4 WILL BEGIN THIS YEAR

Riga SOVETSKAYA LATVIYA in Russian ("News of Science and Technology")
11 Jan 77 p 2

[Excerpt] Nairi-4 is the name of a new computer created by scientists of the Yerevan Scientific Research Institute of Mathematical Machines.

This fourth-generation computer is capable of monitoring the quality of complex radioelectronic apparatus, controlling technological processes, and selecting the optimal route for an ocean liner given complicated weather conditions.

The Nairi-4 performs half a million operations per second, 10 times more than representatives of the preceding generation. It is built from integrated circuits. Thanks to this, its dimensions and weight were reduced by almost 10 times, and its operational reliability was significantly increased.

This computer belongs to the class of small and minicomputers, which are finding more and more applications in the most diverse control systems, as well as in systems to automate the labor of specialists of various types. Series production of the Nairi-4 will begin this year.

USSR

TESTING AND APPROVAL OF NAIRI-4 DESCRIBED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Happy Birthday, Nairi-4! The State Commission Accepted and Recommended for Series Production a New Domestic Electronic Computer") 3 Feb 77 p 4

ORDINYAN, N., correspondent of SOTSIALISTICHESKAYA INDUSTRIYA, Yerevan

[Text] The trials continued for five days and nights without interruption. During this time, what kind of problems were not solved by the new representative of the well-known "Nairi" family, in what modes did it not operate! However, it would be incorrect to suppose that only the new compact electronic computer had to undergo an examination. The tests were also required to yield an evaluation of and results for four years of labor on the part of a large group of associates of the Yerevan Scientific Research Institute of Mathematical Machines.

And here at last is the decision of the state commission, taken from the certificate which it signed: "With respect to its basic technical characteristics and structural solutions, the Nairi-4 does not have any analogs; it surpasses existing models of this family and other domestic computers of a similar class... The machine utilizes the latest achievements of electronic design and applies a number of structural solutions which are peculiar to fourth-generation computers..." And from this comes the conclusion: the computer may be put into series production.

Specialists who study electronic equipment have their own "language," their own concepts, their own measures of evaluation. Thus, for example, they consider one of the basic merits of the new computer to be "the use of the principle of nanoprogramming, which ensures interpretation of a well developed system of microcommands." Although this wording is easily understood only by those who are versed in electronics, another advantage of the Nairi-4 needs no special reflection to be appreciated: the computer uses the so-called microassembly with a high degree of integration, which has made it possible to significantly reduce its dimensions and increase its reliability. Finally, the Nairi-4 is the first domestic computer for which has been developed a memory made from cylindrical magnetic films of a new type.

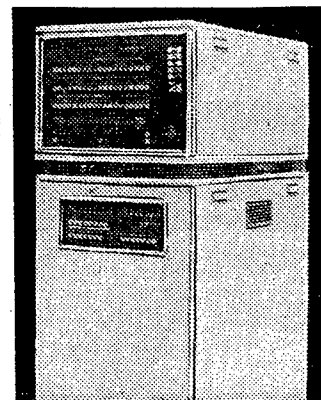
Yerevan scientists and designers prefer unbeaten paths; they do not copy or repeat, but rather seek new and original solutions. Despite this, computers of this family are capable of operating in modes with other computers and utilizing the rich store of programs written for computers of previous types. All this ensures them a wide sphere of application. Incidentally, when they began to work on the Nairi-4, the associates of the institute had to cudgel their brains not a little over problems that were not purely technical.

"We were faced with a complex dilemma," recalls the computer's chief designer, German Artashesovich Oganyan. "How to proceed: to create, as we had previously, a general-purpose computer or to take the path of specialization? We chose the 'golden mean'..."

Using specialists' terminology, one can say that the new computer is problem-oriented. In other words, its structure and technical capabilities make it possible to adopt it wholly towards the solution of a specific task. In one instance this could be the problems of automating a designer's work site, in another--monitoring the quality of radioelectronic apparatus, in a third--control of technological processes, and in a fourth instance--managing air traffic in the region of a major airport.

"Nairi-4 belongs to the class of small computers, which are finding ever greater application in various fields of the national economy and in science and technology," continues the story of G. A. Oganyan. "It is capable of performing approximately 500,000 operations per second. And the capacity of its core memory comprises 64,000 alphanumeric characters. A main channel with a throughput of up to 30 million units of information connects the computer with the 'outside world.' This channel allows a large number of diverse units to be connected to the computer simultaneously."

Thus, the testing was completed successfully, and the certificate was signed. And in the office of the chief designer, where only recently the members of the state commission were at work, the usual atmosphere reigns once again. The creators of the "thinking machines" have dispersed to the laboratories, departments, and plant workshops: a busy time is at hand preparing for series production of the Nairi-4.



USSR

THIRD-GENERATION RUTA COMPUTERS NOW IN SERIES PRODUCTION

Moscow IZVESTIYA ("The Grandsons of 'Ruta'") 4 Mar 77 p 2

KASYUKOV, I.

[Text] Vil'nyus. "Ruta" was the name given to the first electronic calculator, production of which was mastered in the mid 1960's by one of the enterprises belonging to the "Sigma" Production-Technical Association. Now series production of the third generation of the Ruta computers has begun here. These computers, which are capable of 10,000 operations per second, are designed for the automated management systems which are being established in enterprises. Next in line is the manufacture of a high-speed device which will permit direct man-machine dialogue.

USSR

APPARATUS FOR CONNECTING LARGE AND SMALL COMPUTERS DEVELOPED

Kiev RABOCHAYA GAZETA in Russian ("A Link in a Single Chain") 21 Dec 76 p 2

BAUER, A., correspondent of RATAU [Ukrainian News Agency]

[Summary] The article reports on the hook-up of a BESM-6 computer at the Computer Center of the Institute of Cybernetics, Academy of Sciences Ukrainian SSR, with smaller computers at three of the academy's institutions. The large computer can thus be used to solve problems which the small ones are unable to handle. In one situation described in the article, data from a MIR-2, located 20 kilometers away from the computer center, were sent for processing to the BESM-6 via telephone lines.

An electronic apparatus for intermachine communication serves as the link between the two computers of different classes, making it unnecessary to send programs from the smaller computer center to the larger one. The apparatus was developed in the Department of Regional Computer Devices, which is headed by A. T. Bondarenko. The idea for the computer communication system was developed in a laboratory of the Institute of Cybernetics, and then translated into reality in the institute's design bureau and experimental plant.

"Automation of scientific research," says the director of the institute, Academician V. M. Glushkov, "is only part of a large problem--the creation of a single unified control system for the national economy of the country. This is also being worked on by the staff of our institute. Agreements on scientific-technical cooperation, which have been concluded with plants and with repair organizations, are making it possible to implement this program, which is expected to stretch over several five-year plans, with significantly greater rapidity. The lower levels of this huge ASU [automated

control system] 'pyramid' are now being introduced in enterprises and institutions. The first stage of an ASU for planning calculations for Gosplan Ukrainian SSR has already been completed. The first stage of a system for preparing design documentation has gone into operation in Kiev. It will reduce by a factor of 20 the time needed to prepare drawings, and it will lower the cost of documentation by a factor of 10."

POLAND

UDC 681.33.004.14:62-52.001.24

APPLICATION OF MA-48L ITERATION ANALOG COMPUTER TO DESIGN OF CONTROL SYSTEMS

Warsaw POMIARY AUTOMATYKA KONTROLA in Polish Vol 22 No 10, Oct 76 pp 369-371

TUCHOLSKI, TADEUSZ, M.A., engineer, Research-and-Development Center of Automation and Precision Equipment "MERA-POLTIK"

[Abstract] The MA-48L iteration analog computer, manufactured by the Pilot Plant of Electronics and Precision Mechanics of the Silesian Polytechnic, is equipped with a logic attachment provided with a developed control system and an ample logic equipment. Using signals generated by the logic attachment and applying logic elements it is possible to compose a wide range of iteration programs. The logic attachment consists of TTL-type digital integrated elements. The intermediate parts connecting the analog part of the computer with the logic attachment consist of eight keys and seven comparators made of linear integrated elements. The author discusses application fields of the iteration analog computer and stresses its advantages over classical analog computers. Its structure is described and examples of its application in designing control systems are given. Figures 5; references 3 (Polish).

'VIDEOTON-340' - 'MINSK-32' SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 133-135
manuscript received 26 Sep 75, after correction 17 Jan 76

MAR'YANCHIK, SVETLANA PIMENOVNA, engineer, Special Design Bureau for Mathematical Machine and Systems, Ukrainian SSR Academy of Sciences Institute of Cybernetics, Kiev, and SICHKARENKO, PETR IVANOVICH, engineer, Special Design Bureau for Mathematical Machines and Systems, Ukrainian SSR Academy of Sciences Institute of Cybernetics, Kiev

[Abstract] The "Videoton-340"- "Minsk-32" system makes possible immediate exchange of information between a display and a computer and is designed to operate in the "INFOR," "DISKAOD," and "ASU SKB" systems developed at the Ukrainian SSR Academy of Sciences Institute of Cybernetics. It can be used in the dialog and information retrieval mode, as well as for editing texts displayed on a screen and then entering them into a computer. The display is connected to the computer by means of a special link developed by the authors, via the "Minsk-1560" unit. The link is connected to the "Minsk-1560" instead of the data transmitter, and to the display via its telegraph interface. Isolated telephone channels are used as communication lines. Exchange is performed with eight-place symbols with the display operating at a maximum rate of 1200 bauds. Four displays and 28 teletypes can be connected to the computer. The "Minsk-1560's" circuit can be modified to accommodate eight displays and 24 teletypes. A block diagram of the system is shown. The link consists of four identical adapters, to each of which a display is connected. The operation of a single line is discussed from the viewpoint of establishing communication, input, output, and malfunctions. A flowchart is given. The block diagram of an adapter is shown, the adapter consisting of a block for communication with the display, a block for intermediate registration, an information output block, and a control block. A brief note is made regarding software. The equipment used makes it necessary to alternate input and output. Figures 3.

USSR

UDC 519.2

HARDWARE AND SOFTWARE FOR DIALOGUES IN AUTOMATED PRODUCTION CONTROL SYSTEMS

Kiev TEKHN. I MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH, SBORNIK
[Hardware and Software for Organizing Dialogue in Computer systems. Collec-
tion of Works] in Russian 1975 pp 3-7

SKURIKHIN, V. I., MOROZOV, A. A., and KOBOZEV, A. A.

[From REFERATIVNYY ZHURNAL--KIBERNETIKA No 8, 1976 Abstract No 8V741 by Ya.
Metelitsa]

[Text] The study is a report on a high-speed processor for collecting and recording primary data or an automatic message distributor (HAMD), developed in the Institute of Cybernetics, Ukrainian SSR Academy of Sciences. The main capabilities and functions of the system are described; they include the collection of information from sensors, control of terminal devices, ensuring data reliability and various kinds of processing of incoming information. The system is designed for functioning in a complex with the YeS EVM [Unified System] class of computers.

USSR

UDC 518.74

DELTA DISPLAY--A NEW GENERAL-PURPOSE GRAPHICAL TERMINAL BASED ON A MINI-COMPUTER

Novosibirsk SREDSTVA VVODA V EVM I OTOBRAZHENIYA GRAFICH. INFORM., SBORNIK
[Resources for Computer Input and Display of Graphic Information. Collec-
tion of Works] in Russian 1974 pp 16-33

KOVALEV, A. M., and TOKAREV, A. S.

[From REFERATIVNYY ZHURNAL--KIBERNETIKA No 8, 1976 Abstract No 8V764]

[Text] Experience in developing a general-purpose graphical display is presented; the display includes an Elektronika-100 or Elektronika-100I mini-computer.

USSR

PHOTO CAPTIONS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 9, 1976 inside front cover

[Summary] One of the pictures on the cover of the journal PRIBORY I SISTEMY UPRAVLENIYA [Control Instruments and Systems] shows the Iskra-1252 computer complex, which is based on the program-controlled keyboard computer Iskra-125. The Iskra-1252 is designed for complex scientific-technical calculations. It was developed by GSKTBSchetmash [probably State Special Design-Technological Bureau for Calculating Machines] in Leningrad and manufactured by the Kursk "Schetmash" Plant. It was exhibited at "Interorgtekhnik-75."

USSR

APPARATUS FOR TRANSMISSION OF INFORMATION THROUGH SWITCHED TELEPHONE LINES

Kiev VOPR. SOZDANIYA RAS I GOS. SETI VYCHISL. TSENTROV [PROBLEMS OF CREATION OF THE RAS (Republic Automated System) SYSTEM AND THE STATE COMPUTER CENTER NETWORK. Collection of Works] in Russian 1975 pp 41-50

LUCHUK, A. M., YEMEL'YANOV, V. A., and SMETANIN, I. M.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V681]

[Text] The data transmission apparatus described is a component part of the BESM-6-MIR-2 timesharing system based on the DUBNA operating system and allows two-way exchange of information in the semiduplex mode over switched lines with four-wire terminals at 600 bits per second with an error probability of not over 10^{-6} .

USSR

UDC 62-52:007.5

SOFTWARE SYSTEM FOR THE TVER'-YES AUTOMATED CONTROL SYSTEM

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA, SBORNIK [Data Processing on Third-Generation Computers. Collection of Works] in Russian 1976
pp 50-52

AMVROSENKO, V. V., and TEPLITSKIY, E. D.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8G603 by A. V. Izmaylov]

[Text] The "Tver'-Yes" software system, developed jointly by the "Tsentro-programmsistem" Scientific-Production Association (city of Kalinin) and the GKPI [expansion unknown] for Automated Control Systems [ASU] (city of Ivanovo) and designed for use in ASU is described. It is noted that this software system [SMO] is called on to ensure automated introduction and use of the data base as a totality without universal-structure data and individual files, as well as automation of the computing process in ASU's and effective development for the goals of ASU's programs. The SMO is a set of residential, service and functional programs combined into complexes. Functional complexes of programs include: 1. a complex for forming and correcting of the data base with respect to input documents to ensure loading and changing of information in separate files and in the data base); 2. an inquiries complex to ensure printout of data base information in accordance with the search and printout conditions determined by the user); 3. a complex for organization and maintenance of the archive of files to ensure servicing of the centralized storage of generations of data files by means of identification and cataloging of files and archive types of magnetic tapes); 4. an "interface: goal-data base" complex to ensure formation of files from data of the data base and entering of file data in the data base for purposes of joint use of the system with autonomously developed data processing programs); 5. a complex for computing specialized discrete functions to automate the stages of processing data of widely distributed tasks of ASU's for discrete types of production; computation of functions is possible, along with the calculation of product makeup, applicability of parts and assembly units in products, calculation of composite norms on products, of the part-by-part output plan for a period of time by shops and of the demand for resources under the program; and 6. a complex for organization of the computational process in the ASU to implement automatic dispatching of the solution of ASU tasks, with allowance for their interrelationships with respect to time, function, and information. The functioning of all SMO complexes is briefly described. The SMO is implemented as applied to any model of the Unified System of computers [YeS EVM], beginning with its minimum configuration and in two variants: functioning under the control of the DOS [Disk Operating System] or the OS YeS [YeS Operating System].

CASSETTE METHOD OF PREPARING INFORMATION IN THE MAIN MEMORY OF A COMPUTER
WITH ITS CONCOMITANT OUTPUT TO AN ALPHANUMERIC PRINTER

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 103-106
manuscript received 28 Jan 76

SOKOLYANSKIY, ANATOLIY ALEKSANDROVICH, engineer, information and computing center, Housing Construction Combine No. 1, Khar'kov, ISHCENKO, VASILIIY SERGEYEVICH, engineer, information and computing center, Housing Construction Combine No 1, Khar'kov, ALESHIN, VIKTOR YEVGEN'YEVICH, director, information and computing center, Housing Construction Combine No 1, Khar'kov, and ANDREYEV, ALEKSANDR RODIONOVICH, engineer, information and computing center, Housing Construction Combine No 1, Khar'kov

[Abstract] A description is given of the cassette method of preparing information in the main memory of a computer with concomitant output of this information to an alphanumeric printer. This method is suggested to remedy the disadvantages of the start-stop method usually employed, whereby the program waits until a line is printed out on the printer and only after this does preparation of the next write operation begin so that it can be read out in line form by the printer. The use of a single data array to obtain several documents makes it possible to save machine time and simplifies the process of solving economics problems with the computer. The disadvantages of the start-stop method are: The output of each line to the printer takes place during the waiting period; the printer's paper is used uneconomically, i.e., part of its total width can be unutilized; it is not possible to model preparation of information in the main memory and begin to read it out to the printer from a prespecified page number of the document. A flowchart for the cassette method is presented and analyzed. Optimum implementation of this method is achieved by compiling a program module upon whose entry an address to the main memory is forwarded to begin assembly of the line which has been prepared for readout, and through the entire program field an indicator of the end of the next page of the document and an indicator for marking the end of information to be read out. The cassette method has been tried with the "Minsk-32" computer at the information and computing center of Housing Construction Combine No 1 in Khar'kov. Machine time for obtaining various printouts associated with computerized management system problems has been reduced by a factor of 2.5 on average. The speed of data printout is about 400 lines per minute, 40 to 50 percent faster than with the start-stop method. Information can be read out from any predetermined page number. One to four pages of documentation can be read out on a single printer sheet. Savings per computer amount to about 15,000 rubles per annum. For applying the cassette method to other types of computers it is sufficient to supplement the existing standard programs for output to the printer with another program module. Figure 1; references 3 (Russian).

SYSTEM FOR AUTOMATING PROGRAMMING FOR GROUP PROCESS CONTROL

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 65-69
manuscript received 6 Aug 76

GOLOVACH, VLADMIMIR IL'ICH, engineer, Moscow

[Abstract] A system for automating programming is discussed, which was developed for compiling, debugging, and executing programs written in "KAUT," a language for controlling processes. This system is intended for use in the "Integral-M" control complex which utilizes one or two "Elektronika-100/I" minicomputers. A program written in "KAUT" is executed in real time, but implementation of this language by means of only one interpreter is inconvenient, since "KAUT" contains a number of unexecuted operators (descriptions.) The programming system for using "KAUT" consists of a compiler and executive. The program in the entry language is processed by the compiler, which generates an entry text for the executive. The executive exercises direct digital control over systems connected to the "Integral-M" control complex. The "KAUT" compiler is programmed in control computer codes, and it is possible to use the complex's reserve computer for compiling. The dialog system is used to reduce the difficulties encountered by engineers and technicians in learning a language with syntax as complex as that of "KAUT." A simplified block diagram of the compiler is shown. It consists of a core, context tables, a loop, a semantics block, information tables, and a controlled-system program buffer. The core's program performs the functions of a lexical and syntactical analyzer. The semantics block identifies concepts packaged by the core with information recorded in the information tables and changes the content of these tables when necessary. If the semantics block generates a controlled-system code, then it is added to the controlled-system program buffer. The controlled-system program generated by the compiler consists of two components: Operation programs (the result of compiling the language's arithmetic operators), and groups of commands for debugging the operating system (the result of compiling descriptions associated with real time). The executive also consists of two components: The operating system, and the interpreter, which works with translated programs. The operating system allocates the control computer's resources between its users, namely the controlled systems and the control panel of the "Integral-M" system's operator. The interpreter is made up of subprograms which interpret programs written for a virtual computer which runs all the operators of the "KAUT" program, both arithmetic and systems exchange. Programming can be carried out by sufficiently experienced programmers, provided the compactness of systems programs is monitored steadily. The system is now in the trial-run stage, but initial results have shown that use of this system has made it possible to increase considerably the efficiency of using the "Integral-M" control complex. The debugging software has made it possible to eliminate compiling debugging programs individually for each manufacturing process. Figures 1; references 11: 8 Russian, 3 Western.

USSR

UDC 681.3.01

A SYSTEM FOR PROCESSING OF INPUT INFORMATION

Moscow PROGRAMMIROVANIYE in Russian No 5, Sep/Oct 76 pp 83-87 manuscript received 13 Oct 75

NIKOL'SKIY, A. N., and FEL'DMAN, I. Z.

[Abstract] This article studies certain problems related to the creation of an integrated system for processing of input information of the economic type. For this purpose, the authors have developed: an input, testing and editing program, macroinstructions for work with text information, a correction program in various versions. Possible means for improvement of the system are discussed. Methods of reduction of the volume of input information are discussed. The system described in this article was utilized in the creation of the automated management system of a complex of scientific research institutes and experimental plants. The experience gained in developing and operating this system showed that a sharp increase in effectiveness of input information processing of complex structure was possible only by a combined approach to the problem. References 21: 13 Russian, 7 Western.

USSR

UDC 681.142.2

STRUCTURED PROGRAMMING

Moscow PROGRAMMIROVANIYE in Russian No 5, Sep/Oct 76 pp 21-27 manuscript received 14 May 76

BILKUN, S. N., and MASLYUK, G. F.

[Abstract] A review is presented of works dedicated to so-called structured or structurized programming (SP). The essence of structured programming is that it is a rigid form of modular programming, in which programs are composed of structural elements of only three basic types: a) linear sequences; b) a distribution structure; and c) a cyclical structure. The theoretical principles and prerequisites are presented, as well as an analysis of programming languages and SP. Methods and technologies of programming in SP are described, as are the prospects and problems to be encountered in the future development of SP. Though no panacea, it does give hope for successful solution of some of the problems facing programming today. References 20: 17 Western, 3 Russian.

USSR

THE USE OF THE EXPANDED CORE MEMORY OF THE BESM-6 MACHINE IN HIGH-LEVEL PROGRAMMING LANGUAGES BASED ON THE IPM OPERATING SYSTEM

Moscow OB ISPOL'ZOVANII UVELICHENNOY OPERATIVNOY PAMYATI MASHINY BESM-6 V YAZYKAKH PROGRAMMIROVANIYA VYSOKOGO UROVNYA NA BAZE OS IPM (Institute of Applied Mathematics, Academy of Sciences USSR, Preprint No 33) in Russian 1976 28 pp, mimeographed

KONOVALOV, N. A., KRYUKOV, V. A., LYUBIMSKIY, E. Z., and MARTINYUK, V. V.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V734K from the annotation]

[Text] The possibilities are described for using the enlarged memory capacity of the BESM-6 computer in FORTRAN and ALGOL based on the IPM operational system.

The means suggested allow programs to be written in these languages intended for the use of machines with main memories of 100,000 locations; in particular, operation with files of greater than 32,000 cells is possible. To assure effective operation of these programs, they are equipped with special commentaries, and in some cases may contain special operators. The corresponding programs can be run with no changes at all on such machines as the R60 and other machines with large memory capacities. The rules are presented for writing the special commentaries and operators in FORTRAN and ALGOL. Examples of FORTRAN and ALGOL programs are presented.

USSR

UDC 681.142.2

SETL--A VERY HIGH LEVEL PROGRAMMING LANGUAGE

Moscow PROGRAMMIROVANIYE in Russian No 5, Sep/Oct 76 pp 3-9 manuscript received 1 Mar 76

LEVIN, D. YA.

[Abstract] This article describes and illustrates examples of STEL, a very high level set-theory programming language developed at the Computer Center, Siberian Department, Academy of Sciences USSR. It is similar to Setl being developed at New York University. The work is being performed within the framework of an intergovernmental agreement between the USSR and U.S.A. on the problem of "The Use of Computers in Management." The theoretical basis of the two parallel languages is the mathematical theory of sets and in practice sets are the basic data structures used. A characteristic statement is as follows, "Construct set A of objects X such that property P (X) is fulfilled for them." The logic expressions of the language are quite expressive due to the use of features from the language of the calculus of

predicates. A brief description of the two languages is presented, illustrating the differences, to be found primarily in the sense of the input languages and in the actual realizations of problems run in the two languages. References 14: 12 Russian, 2 Western.

USSR

EXPERIMENTAL REALIZATION OF THE LANGUAGE SETL

Novosibirsk TR. VSES. SIMPOZ. PO METODAM REALIZATSII NOVYKH ALGORITMICH. YAZ. CH. 2 [Works of All-Union Symposium on Methods of Realization of New Algorithmic Languages. Part 2] in Russian 1975 pp 145-157

LEVIN, D. YA.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V756 by the author]

[Text] A brief description is presented of the very high level programming language SETL, using the basic concepts of set theory. The report also contains several examples of SETL programs and characteristics of experimental realizations run at the Computer Center of the Siberian Department, Academy of Sciences USSR.

USSR

THE MODELING LANGUAGE "SITRAN"

Novosibirsk SISTEM. MODELIROVANIYE [Systems Modeling--Collection of Works] in Russian No 3, 1975 pp 35-65

GOLOLOBOV, V. I., OKOL'NISHNIKOV, V. V., and CHININ, G. D.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V694 by V. Zhdanov]

[Text] A description is presented of the language SITRAN, designed to model systems with discrete events (computer systems and networks of computers). The algorithmic portion of the language is the standard language FORTAN; the language GPSS served as a prototype for some of the modeling operators. The primary concept in the language is the "request," which is characterized by its parameters and priority. The operation of the model consists of active phases of requests. In addition to requests, other

classes of objects are defined in the language: services, accumulators, ob-
servers, switches, sets and tables. A formal description of the language
is presented (its syntax and semantics) as an expansion of the standard
language FORTAN.

USSR

REPRESENTATION OF STRUCTURES OF DATA IN A HIGH LEVEL MACHINE-ORIENTED
LANGUAGE

Novosibirsk TR. VSES. SIMPOZ. PO METODAM REALIZATSII NOVYKH ALGORITMICH. YAZ.
CH. 2 [Works of All-Union Symposium on Methods of Realization of New Algo-
rithmic Languages, Part 2] in Russian 1975 pp 169-176

CHEBLAKOV, V. G.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V696]

[Text] A study is made of the representation of data structures in the
language YARMO, created under the direction of G. D. Chinin at the Computer
Center of the Siberian Department, Academy of Sciences USSR. A brief de-
scription of YARMO is presented in the volume necessary for subsequent
presentation of the concepts of structuring of data in the language.

USSR

PLANNER-COMPUTER DIALOGUE SOFTWARE FOR GRAPHIC DISPLAYS IN PROJECTION AUTO-
MATION SYSTEMS

Kiev TEKHN. I MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH [Hardware
and Software for Organization of Dialogue in Computer Systems] in Russian
1975 pp 63-71

KALAYDA, YE. I., and AL'PERT, I. B.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V803 by A.
Krasilov]

[Text] A study is made of the "electronic planners' panel" A5433 program
complex based on the DOS ASVT operating system: programs for maintenance,
for testing of the functioning of displays, basic software for the creation
of the logic level of the method of access to displays and problem-oriented
programs for transformation of images. The basic software allows formation

of mosaic, vector and text type images. The macroinstructions for description of the display file, end of description, opening and closing of a file, reading and output to screen, screen clear and control are presented. An example of utilization of the macroinstructions is given.

USSR

ORGANIZATION OF WORK WITH PACKETS OF APPLIED PROGRAMS THROUGH THE SID-1000 VIDEO TERMINALS OF THE M-4030 CONTROL COMPUTER COMPLEX

TR. IN-TA ELEKTRON. UPRAVL. MASHIN in Russian No 52, 1975 pp 33-35

ZAZERSKAYA, M. V., and ZHOLOBOVA, T. V.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V778]

[Text] The authors have developed a program allowing operation of packets of programs in the interactive mode on the M-4030 computer complex with no changes required. This program is intended for operation with the DOS [Disk Operating System] of the ASVT family of computers and performs the function of controlling SID-1000 devices at the physical level.

POLAND

OPERATING SYSTEMS DEVELOPED BY "MERA-PIAP" FOR COMPUTERIZED AUTOMATIC
CONTROL ENGINEERING SYSTEMS

Warsaw POMIARY AUTOMATYKA KONTROLA in Polish Vol 22 No 10, Oct 76 pp 387-388

ORLOWSKI, HENRYK, docent, dr. engr., "Mera-PIAP"

[Excerpts] Recently the Industrial Institute of Automatic Control Engineering and Measurements "Mera-PIAP" in Warsaw has completed elaboration and implemented two operating systems designed for use in computerized automatic control engineering systems. They are: SZPAK (System of Integrated Programming of Complex Automatic Control Engineering) introduced in the Janikow Soda Plant, and PSOT (Simple Technological Operating System), introduced by a number of users of "Mera-303-PI" systems, among others in IASE [expansion unknown], Wroclaw. The SZPAK system is designed for programming continuous slow-variation processes, and it is not only an operating system but also a blank programming system supplemented with the procedure-oriented language PF (FORTRAN's subset). This system may be applied primarily to the data logging and to the superordinated control. It has been developed to make possible designing the computer programs by persons without required qualifications in the programming field.

The SZPAK system may be assimilated and applied gradually. No special knowledge is required to program data logging, only a few-days' instruction is sufficient. To apply the SZPAK system on a wider scale, an elementary familiarity with FORTRAN is necessary, whereas a full use of this system is possible only by a programmer well-conversant with FORTRAN.

The SZPAK system has been designed as a universal system to be applied with any hardware configuration, whereas each type of hardware requires individual implementation.

The SZPAK system has been till now implemented in the systems composed of SMA feedback devices and ODRA-1325 computers operating under the control of the EX2P executor.

Even though sequential and logical control with the use of SZPAK is possible, nevertheless it is not convenient. For this reason SZPAK is not recommended for systems which are solely sequential.

The SZPAK system is composed of the following principal elements:

- the SZPAK operating system which can operate independently or under the control of the proprietary executive program of the given computer;
- the SZPAK blank language;
- the PF language;
- the man-system interactive language.

The hardware configuration with which and for which the SZPAK system is to operate should include the following units:

- central processing unit with core storage;
 - disk or drum store;
 - alphameric monitor (mechanical or display unit);
 - feedback equipment;
 - tape or paper card-related input/output;
- moreover, it may also include:
- control desk (or desks) of technological process;

--system-related keysenders;
--teleprinters;
--printers.

The basic software, integrated with operating software, is exemplified by the above-mentioned Simple Operating Technologic System PSOT designed for the management of programs performing tasks within the framework of the minicomputer--INTELDIGIT-PI unit system. The INTELDIGIT-PI equipment forms part of the All-Polish System of Automation and Measurements POLMATIK and serves to interconnect computers with elements of automation and measurements.

The PSOT system has been so far adapted to minicomputers of the MERA-300 series. Besides servicing INTELDIGIT-PI units this system also ensures the service of the peripheral equipment forming a part of the minicomputer MERA-303 system.

The PSOT system makes possible the performance of up to 29 tasks (programs) which may be initiated at definite moments of time or by interrupts arriving from the controlled process through the INTELDIGIT-PI units. The performance of these tasks is realized one after the other depending upon existing priorities.

PSOT comprehends macroinstructions which facilitate work with INTELDIGIT-PI and functions belonging to the majority of operating systems such as reading binary tapes with programs or reading storage contents. Programs which are to operate under the PSOT control must first be translated into binary form, for example, with the aid of MACROMOTIS assembler.

The technical information is provided by Przemyslowy Instytut Automatyki i Pomiarow "Mera-PIAP" [Industrial Institute of Automation and Measurements "Mera-PIAP"], Osrodek Automatyzacji Kompleksowej i Systemow Cyfrowych [Center of Complex Automation and Digital Systems], Al. Jerozolimskie 202, 02-222 Warszawa, tel. 23-84-89, telex: 813726 pl.

Informacja PAK-Mera, Nr 13/10/76.

POLAND

MINICOMPUTER MERA-BASIC SYSTEM DESCRIBED

Warsaw INFORMATYKA in Polish No 4, April 1976 pp 2-5

BANKOWSKI, Jacek, DOBOSZ, Jaroslaw, FIALKOWSKI, Konrad, HALSKI, Marek, SARNECKI, Tomasz, and SZYMANSKI, Boleslaw, Institute of Scientific-Technical and Economic Information, Warsaw

[Abstract] The authors describe a diskless translator version of a simplified BASIC programming language for the MERA-300 minicomputer series manufactured by the MERA Minicomputer Systems Plant. The MERA-BASIC system is composed of the following functional blocks: scanner, compiler, loader, interpreter, and arithmetic-standard block. It ensures the performance of the four basic arithmetic operations and calculates the values of siae,

cosine, absolute value, square root, Napierian logarithm, and exponent with an accuracy of 14 significant digits. The MERA-BASIC described has been available since the end of 1975. It is envisaged that by the middle of 1976 the MERA 300 will also be equipped with disk store and thus will be able to use the complete BASIC language.

G. Automated Design and Engineering

USSR

HOW COMPUTERS ORIGINATE: I. COMPUTERS DESIGN COMPUTERS

Moscow TEKHNKA-MOLODEZHI in Russian No 9, Sep 76 pp 6-10 interview

GLUSHKOV, V. M., academician, director of the Institute of Cybernetics, Ukrainian SSR Academy of Sciences, Hero of Socialist Labor, Laureate of the Lenin and State Prizes; MAKSIMOVICH, G., correspondent of TEKHNKA-MOLODEZHI

[Abstract] The focus here is on the history and development of automated systems for designing computers, with emphasis on development of software. First-generation computers were designed mainly through the intuition of engineers, without a scientifically founded basis for making calculations. Expenditures of time and labor for developing new computers were enormous. Creation of second-generation computers with an internal intellect represented a fundamentally new direction. The creation of an internal language for internal control of the computer's operation necessitated development of a translator to interpret commands of the operator, but though simplicity was desirable growing complexity resulted in translators equal in expense to computers themselves. The ultimate goal of computer engineering is to establish direct and simple communication between man and machine, but its realization is not expected before the end of the century. The principal problem is to expand the computer's "primordial intellect." New automated methods of designing computers were used to create the "Mir and "Promin" series in the early 1960's, whereby reduced size and labor costs and increased high speed were achieved. The prime direction in developing automated design systems involves development of software. Symbolic languages made possible automatic entry of simple formulas into the computer, which then converted them into binary code, representing a first step in the computer's participation with man in the design process. Problem-oriented symbolic languages made possible control of the computer's operation through control programs. Simultaneously, scientists took steps toward automated design of individual computer blocks, based initially on the automata theory, dating back to the 1950's. The so-called "minor system for automated design of computers" was created about 1963, whereby computers were designed "manually" in modular form, each module having its own purpose with respect to handling of information and its contribution to the output. The machine itself took care of the rest of the work, selecting module circuits and interconnecting components to produce the type of processor intended by the designer. Requirements of further complexity and high speed necessitated a principally new mathematical approach to problem formulation. In about 1967 a new branch of mathematics was developed, called the "theory of discrete transcribers," and the author devised the so-called "dual-basis algebra of program and machine-structure algorithms" (not described here), making it possible to develop special methods of transcribing formulas and of automating the process. This was the origin of a true dialog system, making it possible to design computers in conjunction with all the necessary software. Computers are now closer to possessing true artificial intelligence, enabling them to detect distinctive features and then perform only essential operations for a given

process. They are far from being able to recognize a human face from among many, but we are now on the right path. Hardware is designed using the systems approach, involving construction of information flowcharts, ensuring efficient utilization of hardware. Queueing has been replaced by analog simulation, making possible determination of all variants and selection of the optimum. The first native computer language has been developed to describe the processes taking place in simulation. It is now possible to model various processes not directly related to computers, such as traffic flow and automatic production lines. A new language was developed recently to model certain continuous processes, e.g., the continuously increasing and decreasing output of a nuclear reactor. It is now possible to model a computer and its controlled system as a single unit, each sensitive to the behavior of the other. This has fascinating implications. The software for the system includes about two million program steps. Two thousand man-years would be required using traditional methods or programming, but the new system requires only 75 man-years. Specific details of how the system functions in helping to design new computers is the subject of the next interview, presented in the next issue. Figures 6.

USSR

HOW COMPUTERS ORIGINATE: II. FROM DESIGN TO MANUFACTURE

Moscow TEKHNKA-MOLODEZHI in Russian No 10, Oct 76 pp 16-19 interview

GLUSHKOV, V. M., vice-president of the Ukrainian SSR Academy of Sciences, director of the Institute of Cybernetics of the Ukrainian SSR Academy of Sciences, Hero of Socialist Labor, Laureate of the Lenin and State Prizes; MAKSIMOVICH, G., correspondent of TEKHNKA-MOLODEZHI

[Abstract] The interview continues from the previous issue. A number of stages are involved in the automated design of computers. The configuration of the systems is considered and use is made of the method of analog simulation, making it possible to choose the best variant and work out the relations between systems. Then begins the so-called logical or algorithmic design stage, in which a decision is made on what role to assign to the large units, such as to the processor, and instructions are given to the designing computer as to how best to set up the instruction repertoire, what program steps each unit should perform, and how the information is to be processed. The software for all this was developed for the first time in the world by the Ukrainian SSR Academy of Sciences Institute of Cybernetics. When this stage is completed the functional design stage begins, in which the connections between individual components are determined, based on the fundamentals of the theory of automata. The final stage is the in-plant manufacture of integrated circuits, drawing up assembly diagrams, and the like. Future work on this system will be oriented toward transferring more of the functions of the human designer to the computer. A highly qualified specialist is now required to make the initial design at

the analog simulation stage, feed the information to the computer, receive the result, and enter suitable recommendations. In the future it will be necessary for the designer to make only a general design and evaluate the results obtained from the computer. The main problem at any stage in the development of automation is correct formulation of the problem. Man's role at present is to add the creative element, in which he is aided by experience and intuition, attributes not presently possessed by computers, though problems formerly considered to be of a creative nature have proven to be mechanical once the proper software was devised. The ultimate goal is to create artificial intelligence. A detailed description is given of the use of a computer in the manufacture of integrated microcircuits, whereby instructions are fed to the computer to perform specific operations. In the past it became necessary to develop new methods of making microcircuits, permitting automation with the use of third-generation computers. The special "Kiev-67" control computer was created to solve the problem of automating electron-beam thermal processes which cannot be controlled manually. The "Kiev-70" computer was also created, making possible the use of electronic lithographic processes in the manufacture of microcircuits. Computers have made it possible to create new electronic devices and integrated circuits with features unattainable by other means. Man and machine are brought together in performing one of the most precise techniques known. It is roughly estimated that the system described here has made it possible to reduce the time required for designing computers by a factor of seven to 10, as well as to increase quality and reduce cost considerably. It is strongly suggested that computers be designed directly at the manufacturing enterprise, rather than at the design bureau or research institute, to prevent unneeded creation and transmittal of documentation. The "Kiev-70" computer does not require blueprints or sketches, but is capable of designing directly. Certain operations, however, such as making connections between integrated circuits mounted on boards, require human assistance and documentation at present. Total automation will come when there is a continuous chain of operations: automated design, development of techniques, and manufacture of the finished product. The last stage is automated testing for conformity with specifications. If man is to be eliminated from certain technological processes, robots will be necessary. They will be required along with man in the manufacture of computers in the future. Conclusion of the interview follows in the next issue. Figures 4.

USSR

HOW COMPUTERS ORIGINATE. III. MECHANICAL ARMS AND ARTIFICIAL INTELLECT

Moscow TEKHNIKA-MOLODEZHI in Russian No 11, 1976 pp 18-21 interview

GLUSHKOV, V. M., vice-president of the Ukrainian SSR Academy of Sciences, director of the Institute of Cybernetics of the Ukrainian SSR Academy of Sciences, Hero of Socialist Labor, Laureate of the Lenin and State Prizes; MAKSIMOVICH, G., correspondent of TEKHNIKA-MOLODEZHI

[Abstract] This article is the third and final part of an interview with V. M. Glushkov, Director of the Institute of Cybernetics, Academy of Sciences UkSSR. Glushkov discusses the problems and prospects for the development of robots. The first generation of robots which were actually merely numerically programmed control machine tools, is soon to be replaced with the second generation, man-like mechanisms which can truly be called robots, universal actuating mechanisms which function like the human arm, except that they generally have more joints with a resulting degrees of freedom of motion. They also generally have much simpler manipulating tools than the very complex human hand, plus some means such as wheels for moving about, television "eyes" and a computer brain capable of recognizing patterns. Instructions can be input to the robot by voice, though if the robot is to recognize any voice, rather than one special voice, the number of words it can understand will drop from 500 or 600 to 20 or 30. Glushkov looks far into the future and predicts that robots will eventually have intelligence equivalent to that of the average man, though never as great as a genius.

USSR

STATE OF THE ART IN COMPUTER-AIDED DESIGN WORK

Moscow PRAVDA in Russian ("The Computer Creates Designs") 18 Jan 77 p 3

MYASNIKOV, V., head of the Main Administration for Computer Technology and Control Systems of the State Committee for Science and Technology

[Abstract] Myasnikov surveys the state of the art of computer-aided design work in the Soviet Union. Systems for computer-aided design work (SAPR) are receiving intensive development in those branches of the economy where the complexity and rapid obsolescence of products necessitate experimental-design work on a high scientific-technical level with short lead time. Myasnikov observes that the application of SAPR becomes more important with the appearance of large research-production associations. They offer the possibility for inter-related complexes consisting of systems for automation of scientific research and processing of experimental data, systems for computer-aided design work, planning and technological preparation of

production, and systems for testing and production control.

The State Committee for Science and Technology, with the assistance of ministries and agencies, has developed and approved programs for creation of SAPR. More than 40 organizations developed such systems in the last 5-year plan, and 47 more will become engaged in this work in the present 5-year plan. Myasnikov notes the valuable initiative of the RSFSR Ministry of Higher and Specialized Secondary Education, which organized the development of subsystems and programming for the special "Program SAPR," in which some 50 higher educational institutions are participating.

To realize widespread implementation of SAPR, Myasnikov points out two essential approaches to the problem: on the one hand, development of systems in large planning and design organizations; on the other hand, broad distribution of standard methods of calculation, algorithms and programs among medium-size design organizations, and plant design bureaus. Myasnikov says that not enough effort is being expended by some ministries and agencies. He condemns those who complain that the inadequacy of computer technology is the main deterrent to undertaking work on SAPR. Observing that the very structure of design organizations is oriented to manual labor, Myasnikov says that they must make the change to well-organized methodological work involving progressive design methods, mathematical models, algorithms for calculations, and reference data. If this is done, medium-size design organizations will be able to use individual algorithms, programs and subsystems of SAPR on medium and small computers.

Myasnikov does admit to certain needs in the way of computer technology for SAPR. There are few Soviet computers of sufficient capacity, and peripheral devices and certain software are said to be inadequate. Myasnikov points out that analog-digital computer complexes are most necessary for SAPR. Series production of these complexes has still not been organized.

USSR

UDC 518.74

AN APPROACH TO BUILDING SPECIALIZED SYSTEMS FOR COMPUTER DESIGN OF DIGITAL DEVICES

IZV. LENINGR. ELEKTROTEKH. IN-TA [News of Leningrad Electrical Engineering Institute] in Russian No 187, 1976 pp 3-7

SMOLOV, V. B., and PLOTNIKOVA, A. V.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V788 Authors' Abstract]

[Text] A study was made of several problems associated with building automated design systems intended for a narrow class of objects and allowing for the characteristics of general-purpose computers used in designing. A list of priority tasks is spelled out, using as an example an automated design system for control devices and units, in which macro-operations are executed by the hardware.

USSR

USE OF THE PROYEKT SYSTEM FOR PLANNING OF DIGITAL COMPUTER UNITS AND SUB-ASSEMBLIES WITH A PREDETERMINED SET OF STANDARD ELEMENTS

Kiev TEKHN. I. MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH. [Hardware and Software for Organization of Dialogue in Computer Systems--Collection of Works] in Russian 1975 pp 58-63

KAPITONOVA, YU. V., MITCHENKO, A. I., NIKITENKO, I. N., KHLEBNIKOV, A. I., and SHISHONOK, L. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V673]

[Text] This work studies the possibility of using the operational means of the PROYEKT system to develop the computational units of automatic control system hardware. First, the problem is stated of automating one of the most cumbersome elements of engineering planning of electronic digital devices--logic synthesis of discrete circuits using a fixed set of standard elements. The technical criteria used in synthesis were the actual (documented) load capacities of the standard elements, the length of time delays in logic circuits and the permissible underutilization factor of the functional inputs of the logic modules. The end purpose was to cover the plans for the devices being developed with the functions of the standard elements. A number of working algorithms are presented for the combination circuits formulated and utilized in performing machine synthesis tasks.

USSR

IMPLEMENTATION OF A SYSTEM OF SCHEMATIC PLANNING OF ELECTRONIC DEVICES

IZV. LENINGR. ELEKTROTEKHN. IN-TA in Russian 1976 No 187 pp 69-75

PERKOV, N. K.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V772 by the author]

[Text] A description is presented of the EMTs-1, a system for machine planning of circuits, the general structure of the system and methods of organization of data files. A detailed study is presented of the grammar of the input language and principles of its realization. It is noted that inclusion in the input language of elements of the metalanguage significantly simplifies the tuning of the system to newly connected analysis programs.

II. ECONOMIC APPLICATIONS

A. General Treatment

USSR

UDC 002.5:65.011.56

TRENDS IN THE USE OF CONTROL COMPUTERS

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVO in Russian No 8, 1976
pp 50-53

FILIPPOV, L. G., engineer

[Abstract] Emphasis is placed on the higher reliability gained in using a multiprocessor system structure (employing several mini- or micro-control computers, as opposed to a multiprogram structure (whereby all programs are accommodated by a single large computer), in utilizing control computers for controlling and monitoring manufacturing processes and controlled systems. In running several different programs more or less simultaneously with a single processor, situations arise in which a program must wait its turn to be run, which is not the case when several mini- or microcomputers are used, except when several control computer processors have access simultaneously to a single memory unit. The multiprocessor structure is used for ordinary programs, whereas if the control problem is solved in a manner out of the ordinary the multiprogram structure is more suitable. A comparison is made between large control computers and mini- and micro-control computers, with emphasis on the advantages of the latter from the viewpoint of cost and size. A general description is given of the block diagram of a typical mini control computer. A description is given of several minicomputers now on the market and manufactured in different Western countries, including France, USA, Italy, England, Japan, and Denmark. The Danish model 8008 microcomputer is described in nearly exhaustive detail. This computer is used in a microcomputer system designed for solving problems in total automation of industrial systems, such as rotary roasting furnaces. High technical and economic indicators and high reliability are achieved for industrial plants when the control system has a hierarchical structure, the first level consisting of remote control systems, independent regulators, and simple logic circuits, controlling regulating components. The middle level consists of control computers and centralized monitoring equipment, and the top level of computers which calculate the performance ratings of the plant, as well as functions for predetermining its operating conditions. Figures 3; table 1.

USSR

FORMATION OF FUTURE SUBSCRIBER STATIONS BASED ON MINICOMPUTERS

Moscow STATISTIKA I ELEKTRONNO-VYCHISLITEL'NAYA TEKHNIKA V EKONOMIKE. SBORNIK STATEY, VYPUSK VIII [Statistics and Electronic Computer Technology in Economics. Collection of Articles, No VIII] by the Scientific Research Institute for Planning Computer Centers and Economic Information Systems, Central Statistical Administration USSR, "Statistika" Publishing House 1975 pp 157-162

BORISOV, A. YE., GUBAREV, YU. A., and KRYUKOV, A. M.

[Abstract] An account is given of the advantages of using minicomputers in future subscriber stations as an efficient means of operating on a real time scale, increasing reliability, and creating a balanced system with optimum distribution of functions between the central computer and the subscriber station, particularly as applied to the requirements of future automated enterprise management systems. The subscriber point is thus able to handle several logic operations associated with monitoring data and correcting errors, recoding, and consolidating information, making it possible to free the central processor from performing simple repetitive operations and, consequently, to use it more efficiently for receiving, allocating, and switching messages. Making a minicomputer part of the subscriber station makes it no longer a system with restricted, set capabilities, for then the subscriber station becomes a universal means of communication between man and machine, both in computerized data systems and in automated enterprise management systems. Besides their role of controlling terminal equipment in data transmission networks, minicomputers can also be used as concentrators in operations with remote subscribers, thereby reducing the cost of subscriber stations and the cost of transmitting data through communication channels, in comparison with the direct communication method. Centralizing of control logic and buffer storage makes possible a drastic reduction in the amount of equipment at subscriber stations. The time required to prepare, monitor, and enter data is reduced considerably with the use of a minicomputer at the subscriber station. In addition, it becomes possible to improve several other parameters of the subscriber station, such as to enlarge considerably the range of information sources and users necessary for the data exchange function of the subscriber station, to increase the possible number and types of terminal equipment at a subscriber station, to accommodate new data input and output equipment, to make possible automated exchange of data through communications channels, both with the central processor and with lower-level systems, to make possible independent computations and data processing, to make more efficient use of the throughput of communication channels, and to simplify the programs of the central computer for exchange through communication channels. The YeS series of computers is being furnished with an AP-50 subscriber station utilizing the R-10 minicomputer made in Hungary. A series of specialized minicomputers, such as the M-6000, M-5000, M-400, and Elektronika-100, is being developed. Figures 3.

USSR

ALL-UNION CLASSIFIERS OF TECHNICO-ECONOMIC INFORMATION

Moscow IZVESTIYA in Russian ("The Language of ASU") 1 Mar 77 p 2

POLYAKOV, V.

[Text] The Interdepartmental Council on Problems of Improving Management in the National Economy has summed up the results of its work on the creation of All-Union Classifiers of Technico-Economic Information and unified documentation systems. The council also noted the basic trends of this work for the 10th five-year plan.

Under modern conditions of development of the economy, improvements on the management of the economy are closely connected with computer technology and the country's rapidly growing network of ASU's [automated management systems]. This is why it is extraordinarily important that a complex of inter-connected classifiers be established and put to daily use. They will become a reliable intermediary of information between various levels of ASU's in various sectors of the economy and will ensure the timeliness, completeness, and reliability of data. A specific code designation is conferred on each a concept in accordance with the classifiers, and thus a single ordered man-machine language is created.

B. Overall Planning Methods

USSR

THE PROBLEM OF CONSTRUCTION OF PACKETS OF APPLIED PROGRAMS FOR TERRITORIAL AUTOMATED MANAGEMENT SYSTEMS

Kiev VOPR. SOZDANIYA RAS I GOS. SETI VYCHISL. TSENTROV [Problems of the Creation of RAS (Republic Automated System) and the State Network of Computer Centers. Collection of Works] in Russian 1975 pp 91-96

TERESHCHENKO, V. S.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V753 by V. Mikheyev]

[Text] A discussion is presented of the expediency of construction of packets of applied programs for classes of problems distinguished according to their functional purpose and similarity of algorithms, such as, for example: 1. Prediction and long-range planning; 2. Current planning; 3. Testing of the fulfillment of plans; 4. Analysis of conditions, etc.

A graph is presented of the interconnections of classes of problems and classes with the greatest numbers of connections are distinguished. A brief description is presented of the packets of applied programs for these classes of problems.

USSR

PROBLEMS OF THE CREATION OF AUTOMATED MANAGEMENT SYSTEMS FOR URBAN REGIONS

Kiev VOPR. SOZDANIYA RAS I GOS. SETI VYCHISL. TSENTROV [Problems of Development of RAS (Republic Automated System) and the State Network of Computer Centers. Collection of Works] in Russian 1975 pp 71-81

KOZHURIN, F. D., and GOLOVANOV, E. K.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V740 by V. Mikheyev]

[Text] A study is made of the general principles of creation of automated management systems for urban regions (ASU-rayon). Four levels of functioning of the structure of ASU-rayon are distinguished: the level of regional directive organs, the interbranch level, the branch level, and the level of administration of microregions with groups of enterprises. The annual economic effectiveness of introduction of ASU-rayon is calculated (458,000 rubles), as is the amortization time (2.1 years).

USSR

PHOTO CAPTION

Moscow EKONOMICHESKAYA GAZETA in Russian No 46, Nov 76 p 15

[Text] The automated system of planning calculations which has been introduced in the Estonian SSR Gosplan is playing an important role in the timely development and increased validity of the plan for the development of the national economy of the Estonian SSR during the 10th five-year plan. In the photo: senior technician Yu. Pyarnasalu (in the foreground) and senior engineer R. Park'ya are processing planning calculation programs on the computers.



C. Economic Control at Local Level

USSR

A COMPLEX OF PROGRAMS FOR ORGANIZATION OF THE COMPUTATION PROCESS IN ENTERPRISE AUTOMATED MANAGEMENT SYSTEMS

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA [Data Processing on Third Generation Computers. Collection of Works] in Russian 1976 pp 110-114

TEPLITSKIY, E. D., SHAFROV, A. YA., and NIKITINA, T. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V784]

[Text] A study is made of the composition and function of a complex of programs (CP) for organization of the computational process (OVP) in an enterprise automated management system. Development of the CP is performed for the unified system of computers and is designed for the disc operating system (DOS).

POLAND

MINICOMPUTERS AND COMPUTER SYSTEMS AT ECONOMIC FACILITIES

PR. NAUK AE WROCLAWIU in Polish No 65, 1975 pp 151-166

BILAT, MILOSLAWA, AND BILAT, JERZY

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V748 by T. N. Sidorova]

[Text] In the article it is shown that a minicomputer helps overcome difficulties with equipment during the building of computer systems at the enterprise level. The use of a minicomputer is proposed as an example of work associated with computational problems. The field of use of a minicomputer is shown according to the form of the data processing computer systems. In a simple, nonconversion computer system for data processing, using a minicomputer ensures effective operational actions at the input phase of processing, namely: control of information flows, verification and sampling of data from outside units, preliminary processing and compiling of data files. Thanks to this capability, the main computer is liberated from procedures in controlling input information structures. Thus, a minicomputer enhances the operational effectiveness of a data processing system by shortening the processing cycle.

USSR

PHOTO CAPTION

Riga SOVETSKAYA LATVIYA in Russian 5 Dec 76 p 2

[Abstract] The photograph [not reproduced] shows the machine hall of the computer center of the "Kommutator" Plant's computer center. Known as the "electronic heart of the plant," the center stores and processes information on production and on the public activities and well-being of the workers.

USSR

CERTAIN ASPECTS OF THE MAN-MACHINE DIALOGUE IN AN ENTERPRISE AUTOMATED MANAGEMENT SYSTEM

Kiev TEKHN. I MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH [Hardware and Software for Organization of Dialogue in Computer Systems. Collection of Works] in Russian 1975 pp 38-43

KUDRIK, M. F., and MANN, YE. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V751 by A. Krasilov]

[Text] Problems are discussed within the framework of the "L'vov" enterprise AMS [Automated Management System] with a central processor and two "Nairi-3-2" computers with a common memory field, allowing independent input and output of information at 64 remote terminals. The basis of the enterprise AMS is the data bank, the microprogramming principle of control of the complex of computer hardware, a subsystem of requests, and a specialized operating system. All components are briefly described.

D. Extractive Industries, Fishing

USSR

UDC 681.326+681.3.022

OPERATING SYSTEM FOR AN ASUTP WITH DISPATCH CONTROL BASED ON THE M6000 COMPUTER

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 76-78
manuscript received 26 Mar 76

FEL'ZER, MIKHAIL SEMENOVICH, candidate of engineering sciences, Institute of Automation, Kiev, STETSYUK, IVAN DANILOVICH, engineer, Institute of Automation, Kiev, and SYTNIK, LARISA ALEKSEYEVNA, engineer, Institute of Automation, Kiev

[Abstract] At the Institute of Automation in Kiev an ASUTP [computerized system for controlling technological processes] for mining enterprises has been developed which includes problems of dispatch control of surface-mine, motor vehicle and rail transportation. Essentially these problems amount to determining and specifying the destination and route of each unit of transportation with the purpose of minimizing equipment downtime associated with transportation operations, and unproductive downtime of transport vehicles in fulfilling planned quotas and fulfilling requirements for levelling the quality of ore delivered. The ASUTP at the same time solves problems of operations monitoring and of keeping records of and analyzing the operation of equipment and the surface mine as a whole. In solving problems of controlling surface-mine transportation the control computer's memory has to reflect and correct the production-and-transportation situation, accounting for variable and constant factors. An operating system has been developed at the institute to organize running of operating programs for the functional duties of this ASUTP with dispatcher control, based on the M6000 computer complex. This operating system includes an SRV-M real-time supervisor, an SPO-6000A main control system, and a number of additional programs designed to organize running of applied programs upon the initiative of information transmitters for linking the computer complex with the operator and supervisors of technological processes and for buffered input and output of symbolic information without delaying the computing process. The program for running applied programs upon the initiative of information transmitters is in the form of a group control module driver, to which are connected modules for inputting initiative signals, connected to the transmitters of these signals. Programs for organizing buffered input and output of symbolic information make it possible to call the next program on the list to be run without waiting for completion of the longest input and output operations. Input and output operations are thus completed regardless of whether or not applied programs have been run, thus not lengthening delay in the system. A system of calling sequences is employed for input-output and applied programs. The operating system's additional programs occupy 2,052 words of the core storage. This system has proven effective in organizing running of all programs for dispatch control duties in the real time scale. References 2: 2 Russian.

E. Manufacturing and Processing Industries

USSR

DESIGNING A PROJECT PLANNER

Moscow IZOBRETATEL' I RATSIONALIZATOR in Russian No 10, 1976 pp 6-8

FEDIN, E., engineer

[Abstract] A detailed account is given of the introduction and evolution of the use of the computer in planning forging projects at Uralmash, with emphasis on the pioneering work of R. A. Vaysburd, Doctor of Engineering Sciences. The inefficiency and inconsistencies among human planners are stressed. That it is possible to turn over planning of machining techniques to the computer was demonstrated at the end of the 50's, giving impetus to further studies in the area of stamping and forging by Vaysburd, who began work at the Uralmash plant in 1963. To write a planning program for the computer it was first necessary to determine the sequence of operations in the brain of a human project planner. Planners could not always answer this question fully. The first program provided all the dimensions of stamping and forging and the main parameters of these techniques, information being read out on punched tape. Although the computer at this stage was not superior to man with respect to optimum planning, it surpassed him in speed by far. Information was read out in digital form, requiring a human to transfer it to drawings. In applying computerized planning to commutator shrink rings, the computer not only sped up planning, but also found that one stage of intermediate heating was entirely unnecessary. This represented a truly refined planning technique. The computer took over design operations at Uralmash in 1965. Within a period of two years the computer has planned over 300 hammer forging processes, representing 20 to 30 percent of the techniques employed by the gigantic firm. The techniques were introduced at the Chelyabinsk Tractor-Building Association, the Ural'sk Coach Plant, and the Verkhnesaldinskiy Metalworking Plant, resulting in a savings of 300,000 rubles' worth of metal in one moderately large shop at the latter plant. A true victory was won when the computer created a technique for stamping turbine blades. General-purpose programs have been written, suitable for use with any computer, to serve large or small plants. Programs have been written which take into account the distinctive features of new forging and stamping equipment. The next step is to create computers which can develop new improved designs.

The original article is accompanied by photos of R. A. Vaysburd and of the computer center of the Ural Polytechnical Institute, as well as by a cartoon showing what appear to be a giant and two midgets standing in front of a computer and struggling with a tangled mass of papertape that is issuing from the machine.

ASU IN THE YUGOZAPTRANSSTROY TRUST

Moscow TRANSPORTNOYE STROITEL'STVO in Russian No 1, Jan 77 pp 36-37, 46

GRITSEVSKIY, D. S., deputy manager, Yugozaptransstroy Trust

[Abstract] The Yugzaptransstroy Trust is made up of 10 construction organizations, a production and technological equipment supply administration, a department store, a motor depot, three "Stroydetal'" plants, a crushed-rock quarry, and a machine calculating station. More than 9,000 people work in this collective. The first step in creating an ASU [automatic control system] was the development of the "Sadko-TS" subsystem for automatic supervisory control of building production. The "Sadko-TS" system monitors deviations from the scheduled construction process. A calendar schedule was entered into the computer's memory to reflect the planned progress of building sites, tying in the processes involved in building each site and coordinating them with available resources. Development of an optimum calendar schedule required the inclusion in the ASU of an automatic calendar scheduling subsystem. The Estonian "A-Plan" subsystem was selected from the programs available for this purpose. The labor intensiveness of assembling initial data and creating a production norm base necessitated development of a subsystem for automatic technical planning of production. As a result, the ASU includes three functional subsystems: Technical planning of production; planning of production-economic activity; and operational accounting, supervisory control, and regulation of production-economic activity. This represents the first phase, which is to be built on later. The ASU will automatically solve problems in controlling the accomplishment of building and assembly operations, of providing the production process with labor and equipment resources, and of providing it with materials. Planning of the hardware and operation of the production planning subsystem is scheduled for 1977-1978, and it will be introduced in 1979. The "A-Plan" subsystem will be implemented experimentally on the "Minsk-32" computer in three construction administrations this year. Its applicability has been proven by experience. It can be easily tied in with the "Sadko-TS" subsystem, especially when using programs for YeS computers, the compilation of which will be completed in 1977. Wider use of the "A-Plan" has been hindered by the absence of the necessary production norm base and the high labor intensiveness of preparing initial data. This situation should be changed by introduction of the technical planning subsystem. It is also necessary to try out programs for calculating calendar schedules for the demand for material resources, making up part of the "A-Plan" subsystem. Plans have been made to develop in 1977 standard net models for transportation construction sites based on standard process schedules, tying them in with a program for the YeS computer in 1978 and introducing and utilizing them in 1979. Standardized scheduling documents put out by the "A-Plan" subsystem serve as entry data for the "Sadko-TS" system. By comparing planned and calculated data the "Sadko-TS" system produces control data on deviations between fact and plan, which are used for operative regulation of production. The hardware for the "Sadko" system has been completed and work on its design has been begun. Initial experiments have been successful and it is expected that it will pay itself off in three years.

STRUCTURE OF 'MEDIUS' PROGRAM SYSTEM FOR ON-LINE CONTROL OF CHEMICAL PROCESSES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 53-57
manuscript received 28 May 75

MOTUS, LEO LEOVICH, candidate of engineering sciences, Estonian SSR Academy of Sciences' Institute of Cybernetics, Tallin, and HANSON, VELLO EL'MAR-ARNOL'DOVICH, engineer, Estonian SSR Academy of Sciences Institute of Cybernetics, Tallin

[Abstract] The "MEDIUS" program system is software for ASUTP's [automated systems for controlling manufacturing processes] and is being applied specifically in the YeS-1010 digital computer used in the ASUTP for the manufacture of carbamide. By dispensing with some of the flexibility of universal packages it is possible to reduce a number of operations performed by the supervisor and data processing system. The degree of specialization of the "MEDIUS" system makes it possible to take into account thoroughly the requirements of the main user of the system, the operator of the chemical manufacturing process, who is not a programming specialist. "MEDIUS" performs the tasks of gathering and initial processing of data, direct digital control, scheduling and control of resources, and output of accounting reports and logs. It makes possible an advanced form of dialog between man and computer. The following are discussed: The overall structure of the program system, the principles for allocating programs between the core storage and the auxiliary disk storage, the principles of information linkage between programs, and some of the aspects of arranging multiprogramming with priorities. A detailed description is given of the core of the system--the real-time and data base supervisor. The system was designed on the module principle and it was necessary to design a new real-time supervisor. A block diagram of the system at the subsystem level is shown. The system has a twin structure, in that its supervisor is divided into two, one half controlling resident, and the other non-resident subsystems, and the information link between subsystems is provided by the central data base, containing all the information about the manufacturing process being controlled, whereas the control link is provided by the system's supervisor. Some aspects of generation of the applied program package and data base are discussed. Figure 1; references 13: 1 Russian, 12 Western.

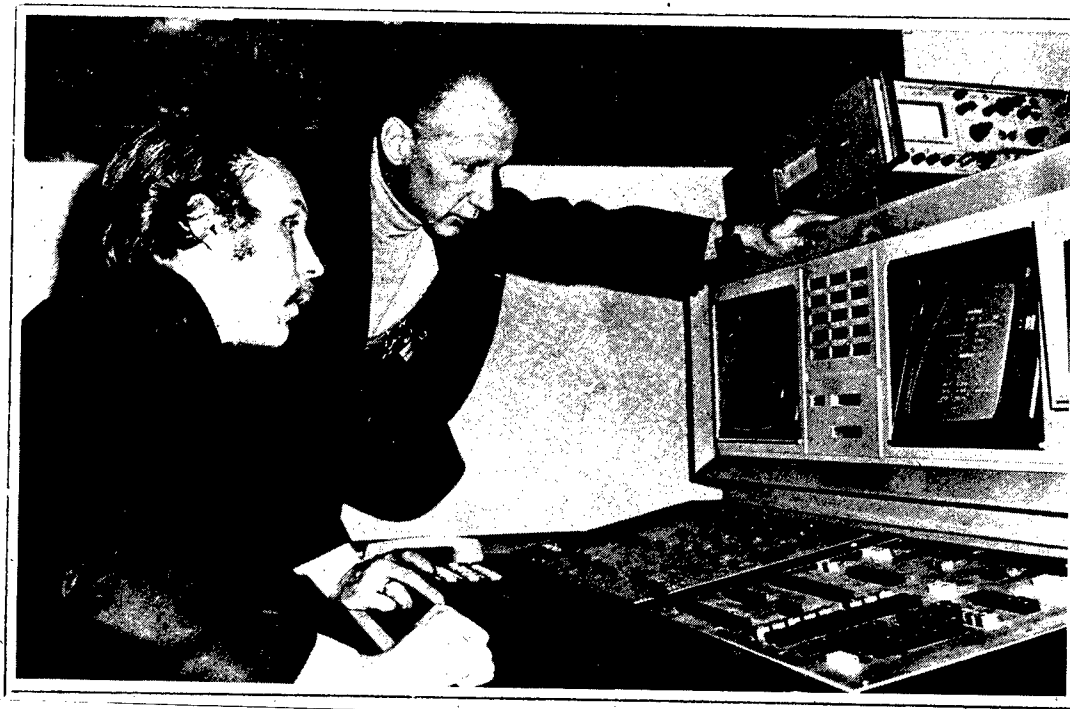
USSR

PHOTO CAPTION

Tallin SOVETSKAYA ESTONIYA in Russian 21 Dec 76 p 2

[Text] An automated technological process control system for a nitrogen fertilizer plant is being developed by the Institute of Cybernetics of the Academy of Sciences Estonian SSR in cooperation with specialists from the Shale Processing Combine imeni V. I. Lenin. The apparatus, which was developed especially for this purpose, is now being tested via interaction with a third-generation computer, the YeS-1010, and computer programs for it are being developed. It is proposed that the new system be introduced at the enterprise in several stages. As early as 1977, the collection and processing of technological data will be entrusted to the computer.

In the photograph: Yaak Bitter (on the right), junior scientific associate of the institute, and Rikho Ayt, senior engineer, are adjusting the control panel which regulates the technological processes involved in carbamide production.



USSR

AUTOMATED CONTROL SYSTEM FOR CARBAMIDE PRODUCTION

Moscow PRAVDA in Russian ("The Electronic Technologist") 4 Jan 77 p 2

[Abstract] An automated system to control the process of obtaining carbamide, which utilizes a computer capable of 500,000 operations per second, has been created by scientists of the Institute of Cybernetics, Academy of Sciences Estonian SSR. This process control system was developed in accordance with an agreement between the institute and the Nitrogen Fertilizer Plant of the "Kokhtla-Yarve" Combine, where the system is now being introduced.

USSR

UDC 681.322.1

'SVAROG'--A DEVICE FOR QUALITY CONTROL OF RESISTANCE SPOT WELDING: SOME DESIGN FEATURES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 129-132
manuscript received 24 May 76

SKURIKHIN, VLADIMIR IL'ICH, corresponding member, Ukrainian SSR Academy of Sciences, Ukrainian SSR Academy of Sciences Institute of Cybernetics, Kiev, MAKAROV, GENRIKH TIMOFEYEVICH, candidate of engineering sciences, Special Design Bureau for Mathematical Machines and Systems, Ukrainian SSR Academy of Sciences Institute of Cybernetics, Kiev, and URSAT'YEV, ALEKSEY ANDREYEVICH, candidate of engineering sciences, Ukrainian SSR Academy of Sciences Institute of Cybernetics, Kiev

[Abstract] Studies made at the Institute of Electric Welding imeni Ye. O. Paton in conjunction with the Ukrainian SSR Academy of Sciences Institute of Cybernetics have shown that it is feasible to create efficient equipment for nondestructive quality control of welded joints, based on multifactor statistical models of the process describing the quantitative relationship between the dimensions of the molten nucleus of the spot weld and the main parameters of the welding technique. A statistical model is given, which, when realized with a computer, makes it possible to predict the quality of a joint when welding aluminum alloys. It is possible to design a device for measuring the parameters of the welding technique and predicting welding quality by using either digital or analog equipment. The digital variant has several advantages over the analog, but it is necessary to digitally integrate input signals with 0.1- to 0.2-percent precision, requiring conversion of input signals into digital form at high speed. A certain amount of preliminary processing of input signals is necessary. Minicomputers have proven unsuitable as the digital computing component. A special-purpose piece of equipment called the "Svarog" device was therefore developed. A block diagram of this device is shown and analyzed, along with a simplified

flowchart. Signals from pickups in the electric welder enter scalers and are then integrated until the welding current reaches a maximum, after which the integrators shift to the storage mode and the signals enter a digital-analog converter via a commutator. Digital codes describing the main operating conditions of the welding process are guided through code buses into a specific block for processing. Signals from a microprogram block determine the sequence for processing digital data, data links between blocks, and generation of control effects. Commands issued by this block depend on the mathematical equation used, containing the parameters of the welding process for a specific material. After all data has been converted a comparison is made between the parameters of the welding process and control points, by means of a digital operations block, and the diameter of the nucleus and the fusion depth is determined according to the formula given. Calculation results for each measurement are indicated in decimal form on a lighted panel. Results indicating defects are flashed to the operator. It is also possible to print out parameters and additional data after welding each spot. The main features of some of the components of the monitoring device are discussed. The experience of more than one half-year's use of this monitoring device in industry has confirmed the correctness of the principles used in designing, the high reliability of the device, and sufficiently good agreement between values of the nucleus's diameter calculated and obtained with the electric spot welder. Deviation between measured and calculated values is within the range of three percent. The device utilizes series 155 and 140 integrated circuits and measures 500 X 300 X 500 mm overall, including all input and readout components and the power supply. Figures 3.

USSR

UDC 681.327

PROBLEMS IN DESIGNING CONTROL PROGRAMS FOR REMOTE INFORMATION SYSTEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 62-65
manuscript received 2 Dec 75, after correction 7 May 76

YEGOROV, GENNADIY ALEKSEYEVICH, senior scientific associate, Institute of Electronic Control Computers, Moscow, SHYAUDKULIS, VLADAS IONO, engineer, Institute of Electronic Control Computers, Moscow, and SHCHERBINA, NIKOLAY NIKOLAYEVICH, engineer, Institute of Electronic Control Computers, Moscow

[Abstract] This article deals with problems in designing control programs for remote information systems based on minicomputers designed to function in the real time scale in ASUTP's [computerized systems for controlling manufacturing processes]. Hooking up remote information systems to the computerized control system's circuit makes it possible to gather automatically information on monitored parameters, as well as to monitor and reflect the state of a controlled system remote from the computer in the real time scale. Control programs for remote information systems make possible performance of

the following functions: Setting up a multiprogram mode of executing functional programs for gathering, processing, and monitoring remote information on the operating parameters of the controlled system in real time; and arranging for the display of direct data on the status of the controlled system in an interrogation-response mode. Thus, from the standpoint of the functions it performs, the control system for a remote information system can be divided into two components: The real time supervisor and the interrogation-response system. The real time supervisor operates on the priority principle, with the interrogation-response system at the lowest priority level. The individual features of these two components are described in detail. Subscribers interact with the interrogation-response system by means of a multi-level interaction language, making it possible for the subscriber to construct interrogations for response in the form of units of data or files of data. Emphasis is placed on the fact that the development of software for remote information systems based on minicomputers is restricted by the limitations of the system's resources. The manner of setting up control programs suggested makes possible the efficient use of the computing resources of minicomputers and the possibilities of multiprogramming. Figure 1; references 2 (Russian).

USSR

AN OPERATING SYSTEM FOR SITUATION CONTROL OF A TECHNOLOGICAL PROCESS

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA [Data Processing on Third Generation Computers. Collection of Works] in Russian 1976 pp 106-110

GROYSMAN, L. I., and KLYKOV, YU. I.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V795]

[Text] This work is oriented toward the performance of tasks related to development of an automated system for planning of technological processes for experimental production, i.e., it is assumed that the plan of the technological process is to be changed in the course of production and only after careful testing in experimental production is it considered finally developed and passed on for series production.

The system suggested, allowing a model to be entered into machine memory and providing the possibility of running of experiments, is based on a situational control language which has the following characteristics: it is discrete, pseudophysical, multiplanar, hierarchical, expandable and has a macrostructure.

USSR

A ROBOT ENTERED THE SHOP

Moscow PRAVDA in Russian 14 Dec 76 and 15 Dec 76 p 2 of both issues

VASIN, M., Pravda correspondent

[Abstract] This is the story of Robert Ivanovich Universal, a computer now working at the Leningrad Electromechanical Plant. Robert works hard all day, taking parts from the assembly line and placing them in a box, having learned his job after being instructed but once. Robert's memory is excellent, since everything he has learned is recorded on a standard tape cassette in his light gray control panel. Robert also has big brothers, known as "work centers," which take metal blanks, mill them, drill them and perform hundreds of operations on them, all under numerical programmed control. It is pointed out that it was the most difficult mental and computational operations which were computerized first, followed by the most complex and precise operations on the assembly line, and only very recently by such seemingly simple operations as picking up objects from one place and moving them to another place. This is quite natural, however, since the simple operations are in point of fact extremely complex, involving such difficult areas as pattern recognition, manipulation, manipulator force control, etc. The Leningrad Electromechanical Plant has created three models of manipulator programmers with varying capacities for pattern recognition and manipulation of objects. These devices are now going into production, and will soon be in use controlling all sorts of production machinery, from painting machines to automatic welding machines.

USSR

ORGANIZATION OF MAN-COMPUTER DIALOGUE FOR OPERATIONAL CONTROL OF A SHOP

Kiev TEKHN. I MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH [Hardware and Software for Organization of Dialogue in Computer Systems] in Russian 1975 pp 52-58

KUDRIK, M. F., PETRONCHAK, M. M., and RYBAK, YE. I.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V802 by A. Krasilov]

[Text] The "ELEKTRON" Production Association has developed a system for operational control of a wood-working shop producing television cabinets using the "ELEKTRONIKA-100" minicomputer: automatic collection of information from various sources and output of control instructions. A structural diagram of the system hardware, the functions of its parts and 20 manual control panels, the tasks performed with programmed control of input and output, with human participation in the system and the capabilities of the system to operate in real time are discussed.

F. Transportation System

USSR

PRIMARY TRENDS IN THE USE OF COMPUTERS IN PLANNING (BASED ON THE EXPERIENCE OF GIPROKOMMUNDOTRANS INSTITUTE)

BYUL. STROIT. TEKHN. in Russian No 4, 1976 pp 45-47

YEGOROV, P. A., and FEDYUSHKO, V. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9G466 by V. K. Pryanikova]

[Text] Computers are used at the Giprokommundotrans Institute [State Institute for the Planning of Municipal Road Transportation Structures] for the performance of the following engineering calculations: design of multi-story frames for industrial buildings, ventilation systems and industrial discharge, heating systems and heat losses, electrical design of high-speed rail mass transit, elements of rail network junctions, flexible chain connections in contact networks, shoreline structures, basic forces in guy system elements and problems for determination of the geometric characteristics of spans of bridges, etc. The Institute utilizes 45 programs for engineering calculation. The introduction of computers allows improvement of the quality of calculation and reduction in the consumption of labor. Practice has shown that calculations using computers require 10 to 20 times less time than traditional methods of calculation. The Institute is working on the introduction of electronic computer equipment based on the Minsk-32 computer to administrative work, and is planning an automated management system.

USSR

COMPUTERS ON THE RAILROAD

Moscow PRAVDA in Russian 21 November 76 p 6

SUKONTSEV, A.

[Abstract] This remarkable article discusses the miserable condition of many of the railroads in the USSR. Even in the title, the word used for "railroad" literally means "pot-bellied stove," and is the equivalent of the American expression "iron horse." The use of this word is intentional, obviously indicating that Soviet railroads, in spite of the use of computers to issue tickets rapidly, have hardly progressed beyond the stage of the iron horse. Many examples are given which are quite reminiscent of the Amtrak horror stories familiar to Americans: a train stops in a station for 2 minutes, the doors are not opened until 20 seconds before departure, then passengers scramble to get off and on the train before it starts moving, losing suitcases, wives and children in the process; passengers walk by 3 empty cars, to discover that several hundred have been issued tickets for the 4th car, which is already full of passengers from earlier stations; passengers arrive 6 hours late, after a 46 hour ride in a train in which

neither the water fountains nor the electricity operate, in which the cars are so full that passengers sleep in the hall, and are charged for riding on a first-class express train! Specific train numbers are mentioned. The author reports that repeated letters from the editors to the Railroad Ministry have resulted in repeated meetings, repeated promises of improved service, with no visible improvement actually occurring. The author finally advises those making short trips to go on foot, those who must travel further to buy a bicycle.

USSR

ELECTRONIC SYSTEM CREATED FOR AUTOMOBILES

Kiev RABOCHAYA GAZETA in Russian ("A Computer for a Chauffeur") 2 Feb 77 p 4

[Abstract] A multi-purpose electronic system for light automobiles of the VAZ [Volkhov Automobile Plant] type has been created at the Chernovtsy Plant of Computer Technology Equipment and will be on sale this summer. The system, which is called "EVM-avto," is designed to be mounted on the instrument panel in front of the driver, where it serves as a warning device for excessive speeds, malfunctions in the car's battery charging system, etc.

G. Construction

USSR

AUTOMATED PRODUCTION CONTROL SYSTEM APPROVED IN KAZAKH SSR

Moscow STROITEL'NAYA GAZETA in Russian ("The First in the Republic") 23 Feb 77 p 2

KUZ'MENKO, B.

[Text] Alma-Ata. The State Commission approved for operation the first stage of an automated industry-wide production control system for the Ministry of Industrial Construction Materials Kazakh SSR.

This is the first ASUP [automated production control system] in the republic, and it includes three subsystems: "Cadres," "Control of Material-Technical Supply," and "Assistant," an information-retrieval system.

H. Trade

USSR

COMPUTER ASSISTS MINISTRY OF TRADE

Moscow SOVETSKAYA TORGOVLYA in Russian ("Give Me Your Advice, Machine")
20 Nov 76, p 4

KRASNYANSKIY, E.

[Abstract] A description is given of a visit to the main Information Computer Center of the USSR Ministry of Trade. The third generation computer at the center has been programmed to perform some 15 jobs, including the example described in this article, in which the machine recommends the optimal version of allocation of funds for the shoe industry for the Republic for one fiscal year.

USSR

AUTOMATED MANAGEMENT SYSTEMS IN TRADE

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 76 p 17

KAS'YAN, A.

[Summary] Tsentrosoyuz [Central Union of Consumers' Societies USSR] and Rospotrebsoyuz [Union of Consumers' Societies RSFSR] have designated Krasnodar Computer Center as the base facility for the development of automated management systems [ASU] in cooperative trade. The working design for the ASU's is being completed at the present time, and installation and reconstruction of computer technology at the primary data processing points are being concluded.

I. Accounting and Statistical System

USSR

BOOKKEEPERS TO RECEIVE COMPUTER TRAINING

Dushanbe KOMMUNIST TADZHIKISTANA in Russian ("The Balance--on the Computer")
10 Dec 76 p 4

KIM, S.

[Abstract] More and more often modern bookkeepers are using keyboard computers and desk calculators such as the Zoemtron-220, Elka, Iskra, and others. According to A. Krasnitskiy, director of the Republic Educational Combine in Dushanbe, which is part of the Central Statistical Administration Tadzhik SSR, the 6,000 specialists which the combine will train during the 10th five-year plan will include not only bookkeepers, but also operators for keyboard computers and punchcard equipment, maintenance mechanics for these machines, and designers to help introduce comprehensive mechanization in kolkhozes and sovkhozes.

J. Financial System

POLAND

CHANGES IN WEKTOR W DATA PROCESSING SYSTEM DISCUSSED

Warsaw INFORMATYKA in Polish No 4, Apr 76 pp 7-9

SANKOWSKI, LESZEK, Laboratory for Designing Information Systems and Organizational Counseling on Construction of ETOBSYSTEM, Warsaw

[Abstract] The WEKTOR W data processing system was introduced in 1972 with the aim of improving the management of investments of importance to national economy. The author describes changes effected in individual subsystems, characterizes their essence, the present state of implementation and prospects of future developments. A block diagram and two tables to illustrate the operation of the system are appended. References 7 (Polish).

Leszek Sankowski, M.A., graduated in 1972 from the Warsaw University (Mathematics, Econometrics). His Master's thesis on the subject of computer simulation in the Institute of Economic Sciences has won marks of distinction at the TNOiK [Scientific Society of Organization and Management] competition of M.A. dissertations. At present, Sankowski acts as General Designer for matters of the development of central systems at the Laboratory for Designing Systems of Information and Organizational Counseling on Construction of ETOBSYSTEM at the Information Science Center ETOB.

K. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

COMPUTER USED TO AID CHEMIZATION OF AGRICULTURE

Tashkent PRAVDA VOSTOKA in Russian ("Computer in the Service of Chemization")
22 Dec 76 p 3

[Text] Namangan. The Tashkent Affiliate of TsNIIO [Central Scientific Research Institute of Agrochemical Servicing] has developed a series of recommendations for the Namangan Zonal Agrochemical Laboratory concerning the utilization of mineral and organic fertilizers in the farms of the Turakurganskiy, Chustskiy, and Kasansayskiy Rayons.

On the basis of agrochemical maps and with the aid of a computer the associates of the affiliate determined optimal norms for introducing various fertilizers, drew up plans for the use of the fertilizers, and predicted the productivity of the cotton plantations up to the end of the five-year plan.

The scientific associates are now working on analogous measures for the farms of the Papskiy, Uychinskiy, and Namanganskiy Rayons. It is planned to complete all work in this oblast sometime next year.

USSR

SIBERIAN AGRICULTURAL SCIENTISTS ACQUIRE YES-1022

Moscow SEL'SKAYA ZHIZN' in Russian ("A Powerful Computer") 26 Jan 77 p 5

OPARIN, S., Novosibirsk

[Abstract] A YeS-1022 computer has been installed in the Institute of the Economics of Agriculture of the Siberian Branch of VASKhNIL [All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin].

USSR

UDC 681.326

DESIGN OF OPTIMUM EQUIPMENT SYSTEMS ('ROST' APPLIED PROGRAM PACKAGE)

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 40-45
manuscript received 18 May 76

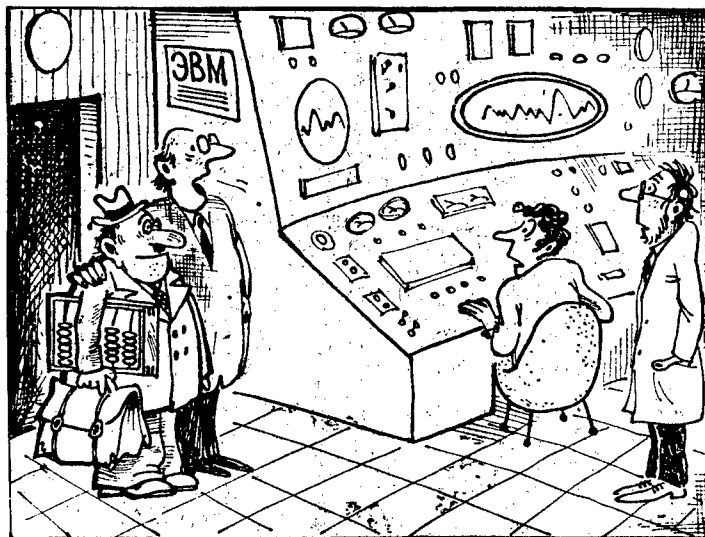
KUSHNIROV, VLADIMIR AVDEYEVICH, department chairman of the Special Design Bureau for Computer Software Systems of the Ukrainian SSR Academy of Sciences Institute of Cybernetics, Kiev, and FINN, EDUARD AL'BERTOVICH, candidate of economic science, Ukrainian Scientific Research Institute of Mathematical Economics for Socialist Industry, Kiev

[Abstract] The selection of optimum equipment systems has gained increased importance in various industries of the national economy owing to the necessity of taking into account various types of interaction between pieces of equipment, both from the standpoint of arranging a set of equipment to perform a specific operation and restructuring individual or full-scale operations in making an analysis of the efficiency of future variants of interchangeable equipment. The design of optimum equipment systems is a necessity in such fields as air transport, computer technology, mining, and agriculture. Part of the problem is to select the optimum inventory of equipment and determine the required amount of machinery for a specific industry for a certain plan period, with minimum imputed costs. It is shown mathematically that selection of the optimum equipment inventory for a single enterprise is an important component of the problem of making a general analysis of completion of work quotas for a specific period at enterprises of different types within a specific industry, taking into account differences in the specifications of machines of different types and their interaction in the over-all inventory structure. Solution to this complex problem requires breaking it down and solving its separate components as individual problems and then finding a general solution. The method of differentiated estimates is described, whereby the basic large-matrix problem is solved by solving several sub-problems with matrices of considerably smaller size. A description is given of the man-computer method of solving the equipment-system problem, whereby a group of expert specialists in the industry intervenes in the intermediate and final steps of the iterative process performed by the computer. Experts decide whether to add or remove a specific type or types of equipment and the system of programs implementing the algorithm shows the computer's reaction to these decisions. A flowchart is given for the algorithm and it is described in detail. It is emphasized that the optimum equipment system is not the simple sum of the inventories of individual enterprises but a complicated interrelationship between these inventories. A description is given of the "ROST" [Design of Optimum Equipment Systems] program package used in the "Minsk-32" computer for solving the problem. This package utilizes the modular programming principle, with 17 program modules in different programming languages, specifically FORTRAN-IV and ASSEMBLER. Figures 1; references 9: 9 Russian.

USSR

Baku BAKINSKIY RABOCHIY in Russian 4 Dec 76 p 4

[Text] Caption: "And here is your new chief, an enterprising practical worker." Sign on the wall: EVM [Elektronnaya Vychislitel'naya Mashina; electronic computer].



III. SOCIOLOCULTURAL AND PSYCHOLOGICAL PROBLEMS

A. Urban Systems and Communal Services

USSR

WITH THE HELP OF AN ASU

Moscow EKONOMICHESKAYA GAZETA in Russian No 3, Jan 77 p 17

GERASIMOV, N., correspondent of Ekonomicheskaya Gazeta, Chelyabinsk

[Summary] The first stage of an ASU [automated management system] was put into operation a year ago in the Chelyabinskaya Oblast Administration of Residential-Municipal Economy. It consists of five subsystems, which solve 66 problems in the areas of timely management, repair services, material-technical supply, planning calculations, bookkeeping, and processing of statistical information. Indeed, since 1 January of this year, all statistical and bookkeeping operations have been transferred to the computer. Procedures for the system were developed by the Academy of Municipal Economy, the Main Computer Center of the Ministry of Residential Municipal Economy RSFSR, and the Sverdlovsk Planning and Design Bureau for ASU's of the Ministry of Instrument Building and Automation Equipment.

"Development and improvement of the systems are now in progress," according to Yu. Zrakov, chief of the computer center. "We are devoting special attention to the subsystems for control of the technological process of water supply and control of municipal electrical transportation.

"We plan to have the system completely organized on the basis of third-generation computers by 1979. To ensure greater timeliness, multiple-user information communications posts are being established in Magnitogorsk, Zlatoust, Miass, Troitsk, and other cities throughout the oblast."

USSR

YeS-1022 USED IN AUTOMATION OF MUNICIPAL SERVICES IN THE LITHUANIAN SSR

Moscow ZHILISHCHNOYE I KOMMUNAL'NOYE KHOZYAYSTVO in Russian ("The Computers' First Steps") No 1, Jan 77 pp 10-11

BALTRUSHKYAVICHYUS, I., chief of the Technology Division of the Lithuanian SSR Ministry of the Municipal Economy

[Summary] Work on the development of an automated control system [ASU] for the Lithuanian SSR's municipal economy was started in 1972 when the Vil'nyus Planning and Design Bureau for ASU's of the USSR Ministry of Instrument Building, Automation Equipment and Control Systems drew up the technical specifications. An ASU group was established in 1974 at the Institute for Planning the Municipal Economy, and on the basis of this group a computer center was formed. Its functions include not only the operation of the computers, but the development and introduction of ASU's for housing and various other municipal services and the solution of individual computing-planning and engineering tasks. For example, computer center personnel

have developed a single uniform card for computing apartment and municipal services, electrical energy, and communications services. This card will replace the two to three now in use, and the savings resulting from the reduction in the volume of paper processed will amount to 105,000 rubles per year in Vil'nyus alone. In order to introduce this standard card, many bureaucratic hurdles had to be overcome and rules pertaining to its use had to be worked out.

The staff of the Computer Center of the Ministry of the Municipal Economy Lithuanian SSR now numbers 57 persons; in the near future it will be expanded to 94. In November 1976 a complex of YeS-1022 computers was put into operation at the center. The young staff, which is headed by V. Kershis, mastered these computers in two months, half the amount of time established as the norm. Over three months of operation, the average computer load has reached 10 hours per day, and by the end of 1977 the computer center will convert to three-shift operation. In view of the increasing volume of computational work, it is planned to put a second group of YeS-1022 computers into operation in 1978. For this purpose a new building is being constructed for the center.

USSR

COMPUTERS IN CIVIL AVIATION

Moscow GRAZHDANSKAYA AVIATSIYA in Russian ("The Good Services of the Computer") No 8, 1976 pp 10-11

ZHEBRACK, V., Chief of Main Agency for Air Service, Ministry of Civil Aviation

[Abstract] The rapid development of civil aviation has greatly increased the complexity of the tasks which must be performed by the ticketing agencies. In the past 10 years, the number of passengers departing Moscow through its airports has more than doubled, from 4.5 to 10.3 million per year. The very nature of air transport requires that these passengers be serviced rapidly. However, it is far from simple to organize the sale of tens of thousands of tickets at hundreds of points so that passengers can buy tickets for any desired destination without difficulty. Add to this problem the fact that transmission of messages through the civil aviation system sometimes requires as long as the flights themselves, the periodic need to adjust the flight schedule and the introduction of new equipment, the need to react quickly to seasonal and random changes in demand for air transport, and it becomes obvious that the only way out is to use computers to automate the process of reservation making and ticket selling. In 1964, the development of such a computerized system was begun. In 1968, the first section of the system, based on a Minsk-23 computer, went on stream; it was designed to reserve seats in planes arriving and departing from Moscow for passengers traveling through Moscow, to prevent the seats from

being sold before the aircraft arrived to passengers departing Moscow. The entire reservation system "Sirena" began operation in 1972, and its effectiveness and extent of application have been increasing ever since. At times, up to 94% of all seats have been reserved through the system. Suggestions for improvement include: stopping the practice of closing down the automatic reservation system 10 minutes before a flight departs, to allow the system to maintain an accurate count of seats available right up to the moment of departure; continuation of ticket sales for delayed airplanes, which sales are currently stopped as soon as the airplane is reported late, even though it may have seats still available. One of the most difficult problems is rapid and precise transmittal of information to the population concerning schedules, prices, availability of seats, etc. An "Informex" display system is now in use in Moscow, informing ticket agents and passengers of the actual status and schedule of flights.

One of the primary problems with the Sirena system is that it only handles flights which pass through Moscow. Similar systems are needed in many other aviation centers in the country, and their operation should be coordinated by a central automated management system for flight reservations. The development of such an all-union system has been begun by the Ministry of Instrument Building, Automation Equipment, and Control Systems USSR together with a number of civil aviation organization. The system, called the ASU-5, is to include video display terminals, central scheduling computers, communications lines and ticket agent inputs. Any operator in the system will then be able to make reservations throughout the system for any flight in the country. Development and construction of this system will require some time, but will greatly facilitate travel by air in the Soviet Union. Work has already begun on the Moscow and Riga centers, which will go into operation at the end of the 10th five-year plan.

USSR

SIRENA SYSTEM ASSISTS AIRLINE PASSENGERS

Moscow TRUD in Russian ("Sirena Assists Passengers") 4 Mar 77 p 2

[Abstract] During the past three years the "Sirena" automated control system for airline ticket sales has saved passengers more than 20 million hours of time waiting in lines. "Sirena" now connects Aeroflot agencies in Moscow and 40 other cities, including Tashkent, Khabarovsk, and Magadan.

POLAND/WEST GERMANY

LUFTHANSA AIRLINES RESERVATION SYSTEM

Warsaw INFORMATYKA in Polish No 4, Apr 76 pp 22-25

MACIASZEK, LESZEK, Academy of Economics, Wroclaw

[Abstract] The article discusses the multi-access reservation system of the LUFTHANSA Airlines. It gives the functional and technological characteristics of the system and its subsystems and describes its hardware, peripheral units, stars operating system, and the data transmission network. The author concludes that the LUFTHANSA system is one of the world's most modern and that IBM and UNIVAC installations decidedly dominate the world market as regards reservation systems. He briefly comments upon the present state of the airline reservation in Poland (LOT Automated Reservations, connected through 20 Raytheon computer display units with SITA GABRIEL world system) and urges taking steps to design an All-Polish reservation system of tourist services. Figures 3; references 9: 2 Polish, 7 Western.

Leszek Maciaszek, M.A., graduated in 1972 from the Department of Data Processing Organization of the Academy of Economics in Wroclaw. He works at present as Senior Assistant at the Institute of Information Science of the Academy of Economics. He is the author of several articles and reports and the coauthor of several lectures and manuals relating to design, effectiveness and applications of information systems; he specializes in problems of designing multi-access information systems in general and reservation systems in particular.

USSR

UDC 005:681.3.022

ANALYSIS OF THE DYNAMICS OF INTERACTION BETWEEN THE USER AND THE AIST-O
TIME-SHARING SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 82-88
manuscript received 12 Jun 74, after correction 13 Mar 76

MAKSIMEY, IVAN VASIL'YEVICH, candidate of engineering sciences, Gomel' State University, Gomel', METLYAYEV, YURIY VALENTINOVICH, engineer, USSR Academy of Sciences' Siberian Department's Computer Center, Novosibirsk, and POLEZHAYEV, ALEKSANDR IVANOVICH, engineer, USSR Academy of Sciences' Siberian Department's Computer Center, Novosibirsk

[Abstract] The AIST-O time-sharing system utilizes M-220 and "Minsk-22" computers and was designed with a view toward increased capacity and resources as well as configurational possibilities without regard to the creation of the optimum variant of the system. The system was designed to be general-purpose, making it possible to implement and study batch processing and a wide assortment of dialog programs. The system is made up of working processors, a "MONITOR" control processor with an advanced interrupt and readiness system, and specialized exchange equipment, namely, a bulk storage selector for performing exchange operations with files and an external channel selector for performing exchange operations with input-output equipment. The information processing equipment has parallel access to the system's core storage through a commutator. The system has a multichannel link with external information sources and users, which can be in the form of centralized input-output equipment and various remote user's consoles, such as teletypes and typewriters. Magnetic drums, disks, and tapes are used as external information files. The main goal of the AIST-O's design was to provide every possibility for setting up multiprogramming and multiprocessing modes in the system, as well as time-sharing and memory-sharing modes. A study was made of the dynamics of interaction between the user and this system to determine its response characteristics and performance rating. Two types of interaction between the user and the system are possible: Through program steps and through information. The parameters of these types of interaction are defined, measured, and analyzed. A detailed analysis is made of the relationship between the time for one cycle of a single interaction between the user and the system and various modes of operation of the system and the number of users at its input. It was concluded that the system's level of response is satisfactory, not exceeding three seconds. The time for one cycle of interaction fluctuates within the range of 10 to 30 s. Most of the time is consumed in information input and output. The system's resources are used sufficiently efficiently. It was determined that it is necessary to increase the operating speed of the "MONITOR" to increase the system's rate of response to interrogations. This will require replacing the "Minsk-32" computer in the variant studied with another type of computer with more rapid response. The variant which uses computers of the same type for the "MONITOR" and the working processors is considered preferable in that it makes it possible to simplify substantially the "DISPATCHER" program used. Figures 2; table 1; references 5 (Russian).

USSR

UDC 62-50:338.98

USE OF MAN-MACHINE COMPLEXES IN DECISION-MAKING PROCESSES FOR RESOURCE DISTRIBUTION

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian No 5, Sep/Oct 76 pp 15-19 manuscript received 25 Nov 75

BELYAYEV, I. P., and MEDVYEDEV, B. G., Moscow

[Abstract] The authors examine a complex of man-machine models for resource-distribution decision making on organization structures represented by consecutive graphs. They propose dialog procedures for constructing a resource distribution plan at each graph level as well as procedures for plan coordination. The described model was constructed as a complex of man-machine procedures within the framework of an automated control system for living area distribution in the city of Moscow (ASU "KURS"). The software was written in BASIC FORTRAN for the operating system DOS/YES using the YES 1020 electronic computer. The entire complex was built on the modular design principle. References 6 (Russian).

USSR

UDC 621.391:681.3

ADAPTIVE SYSTEM FOR EXCHANGING INFORMATION BETWEEN A COMPUTER AND REMOTE USERS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 9-15 manuscript received 21 Oct 75, after correction 23 Apr 76

DANIL'CHENKO, IGOR' ANTONOVICH, doctor of engineering sciences, Moscow, and LEVINSON, EDUARD IOSIFOVICH, candidate of engineering sciences, Moscow

[Abstract] One of the most complicated problems in creating integrated computerized management systems is ensuring efficient exchange of information between computer complexes making up the computing base of the system and territorially remote information sources and recipients, through communication channels. Existing terminal equipment of different types for information entry and output is far from sufficient for solving this problem and must be supplemented by a set of special hardware for centralized control of the information exchange process, guaranteeing efficient functioning of the system as a whole and uniting into a single system the set of various components taking part in the process of remote data exchange. An analysis is given of a block diagram of an arrangement for linking remote users with a time-sharing computer system's base computer, indicating different variants of linking up user's stations. It is demonstrated from this analysis that the possibilities and characteristics of information systems are greatly determined by the specifications for providing for exchange of data between

the base computer and user's stations. Emphasis is placed on the necessity of reducing distortions in information by using communication channels equipped with hardware for increasing reliability of data transmission. This involves the use of special software which takes into account the properties of the information source and recipient and the characteristics of intermediate components in each communication network. Since these characteristics are not uniform and vary in the process of the computerized management system's operation, this facility must be flexible and capable of adapting to various situations. The necessary properties of an adaptive system for information exchange (ASOI), which is a system of both hardware and software components, are as follows: Hierarchical monitoring of the proper functioning of individual components of the computerized management system participating in the exchange process; protection of the software data base of the system from incorrect operations by users, as well as from noise in communication lines; storage of files of input and output data to restore the efficient functioning of the system after eliminating emergency situations; and automatic transfer to the use of reserve equipment if the main equipment fails. A formalized description is given of the structure of an ASOI, proceeding from special-purpose functions of the information exchange system, which are divided into a set of specific special-purpose functions structured in such a way that the functional configuration of this set will satisfy certain boundary conditions. The concept of local efficiency of the system is introduced, serving as a basis for choosing hardware and software. The methodology for solving the formal problem is based on a combination of methods of making a systems analysis of individual components of the ASOI and modeling the process of the system's functioning while simulating disturbances from the outside environment. Figures 2; references 6 (Russian).

USSR

THE EFFECTIVENESS OF TELEMETRY DEVICES AND SYSTEMS WITH SPEECH AND CODED SPEECH OUTPUT SIGNALS

Riga UPR. SLOZHN. SISTEMAMI [Management of Complex Systems. Collection of Works] in Russian No 3, 1976 pp 116-125

PIROGOV, V. V., and MARKELOV, I. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V902 by the authors]

[Text] A brief analysis is presented of the status of the problem of management of computer equipment by means of speech signals. It is shown that the solution of this pressing problem requires combined development both of devices for automatic speech recognition and of devices for automatic transmission of speech information through communication channels.

Specific versions of tested original devices and systems with speech and coded speech signal outputs, used for construction of an information collection system for automation of technological processes, are presented. The problems involving investigation of this class of device and systems for selection of structural characteristics are stated. The basic problem involved in the investigation is the problem of maximization of

interference stability. The criterion of interference stability of devices and systems with coded speech output signal is considered to be composition of formant intelligibility of the speech signal and the probability of a non-detected error. Stages for the investigation are suggested. References 35.

C. Machine Translation

USSR

COMPUTER TRANSLATES INTO RUSSIAN

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 19 Jan 77 p 4

BELOTSEKOVSKIY, A., Kazakhstan Telegraph and News Agency

[Abstract] A machine translation system has been developed which, when implemented with "Minsk" series computers, makes it possible to translate scientific literature from Russian into English. The resulting translation is a word-for-word rough translation which requires subsequent editing but which is intelligible to specialists and is sufficient from the information standpoint. Ways are being sought to improve on the system's syntactical and grammatical deficiencies. According to K. B. Bektayev, chairman of the Department of Probability Theory and Mathematical Statistics of Chimkent Pedagogical Institute, machine processing of a foreign-language text is approximately five times less expensive than a human translation and bulk, rough translations are obtained no less than 10 times faster, including subsequent editing time. The computer translated four pages of a scientific article in 15 minutes, taking another 15 minutes to produce a printout of a rough translation. The original text is punched out on tape and fed to the computer. The computer utilizes the "Bektayev effect," whereby mathematically defined features of terms and terminological combinations are used as the computer's recognition apparatus. The computer undergoes a preliminary period of training, i.e., a dictionary is entered into its memory, consisting of a store of English word forms with lexical and grammatical information codes for their possible translations, and of a data bank of Russian word forms and their translations, and also of an English-Russian phrase dictionary. Also entered are various programs and subprograms for automatic translation. The Chimkent "Linguistic Statistics" group headed up by Bektayev is the first in the country to make industrial use of a statistically processed vocabulary form of machine translation. Work on machine translation is being coordinated by VTsP, the All-Union Center for Translation of Scientific and Technical Literature and Documentation, which is affiliated with the State Committee on Science and Technology of the Council of Ministers USSR and with the Academy of Sciences USSR. A statistical data base is being formed for a description of texts in Indo-European and Turkic languages, with the aim of creating a word-by-word system of automatic analysis, annotation, and referencing, and of automating translation of scientific and technical and other texts from English, French, and German into Russian. The long-range goal is to create a Soviet system of machine translation for industry; the short-range goal for Kazakhstan is to obtain machine translations of materials on plasma physics from various Western European languages into Russian. Emphasis is placed on the necessity of a mathematical approach to textual analysis. A well-equipped problems laboratory will be an asset in centralizing all the research being done by the "Linguistic Statistics" group.

D. Artificial Intelligence

USSR

ROBOT TECHNOLOGY AND ITS SCIENTIFIC PROBLEMS

Moscow ZNANIYE-SILA in Russian No 10, Oct 76 pp 5-7

ARTOBOLEVSKIY, I., academician, and KOBRINSKIY, A., doctor of technical sciences

[Abstract] A brief description is presented of some of the most important problems of robot technology currently under development at the Institute Machine Science. These problems include the development of robot manipulators capable of reproducing the movements of the human body, particularly the upper and lower extremities, and development of a system of artificial intellect to allow the motions of the robot to adapt themselves to the developing situation, so that it may continue to perform the assigned task in spite of changes in the environment.

USSR

UDC 681.326

MODULAR SOFTWARE SYSTEM FOR AN INTEGRATED ROBOT

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 57-62
manuscript received 22 Jul 75, after correction 8 Mar 76

NIKIFOROV, VIKTOR VIKENT'YEVICH, senior scientific associate, Far-East Science Center of the USSR Academy of Sciences Institute of Automation and Control Processes, Vladivostok, NOVACHENKO, SERGEY IVANOVICH, graduate student, Leningrad Polytechnical Institute imeni M. I. Kalinin, Leningrad, PAVLOV, VLADIMIR ANATOL'YEVICH, graduate student, Leningrad Polytechnical Institute imeni M. I. Kalinin, Leningrad, and YUREVICH, YEVGENIY IVANOVICH, doctor of engineering sciences, Leningrad Polytechnical Institute imeni M. I. Kalinin, Leningrad

[Abstract] The principles of modular programming are applied to structuring an algorithmic system for controlling robots (ALSUR). This type of structure makes it possible to modify and develop easily the system which has been created, to create and adjust modules independently of one another, and to simplify adjustment of the entire system. An ASVT control computer based on the M6000 processor is used for data conversion, assisted by a specialized software system developed by the authors. Use is made only of a library of standard subprograms from the standard software for the ASVT M6000. The modules of the ALSUR are generally speaking elements of the problem-oriented language used to control the robot. Here use is made of the "ROKOL" language developed earlier by the authors for controlling robots. A block diagram of the structure of the ALSUR and a functional diagram showing the modules of the algorithmic system are shown, indicating the relative priority of programs in the latter case, each module being

regarded as an individual user of the computer. The purpose and function of each module is described. The module principle makes it possible to expand and modify the ALSUR without changing the entire structure by adding new and altering existing program modules. This system has been used at the Leningrad Polytechnical Institute imeni M. I. Kalinin to control an experimental robot called "Robin," which can perform such complicated operations as finding and grasping randomly placed objects and performing assembly operations. The structure of the system makes it possible to control several robots along with the containers they work with in a particular industrial process, i.e., to automate a manufacturing section completely, using only one computer. Figures 2; references 5 (Russian).

IV. NATURAL SCIENCE RESEARCH
A. Biology and Medicine

USSR

THE COMPUTER LOOKS FOR A DRUG

Moscow SOVETSKAYA ROSSIYA in Russian 2 Dec 77 p 4

POL'SKOY, G.

[Abstract] The scientists at the Scientific Research Institute for Biological Testing of Chemical Compounds have developed effective methods for computer-assisted search for new drugs. The formulas of some 7000 known drugs are stored in computer memory. As each new chemical compound is synthesized in a research laboratory in the country, its formula is sent to the institute, and the computer compares it with the formulas of known drugs in order to attempt to predict any possible biological effect which the new chemical might have. Those which are judged promising can then be tested further by humans. This would be impossible in a Capitalist country, since pharmaceutical firms would hardly be likely to share the formulas of their latest chemicals with their competitors.

B. Physico-Chemical and Earth Sciences

USSR

PHOTO CAPTION

Riga SOVETSKAYA LATVIYA in Russian 25 Nov 76 p 4

[Text] Computer technology is being used extensively in the Institute of Organic Synthesis of the Academy of Sciences Latvian SSR. Computers are being used to help calculate the spacial distribution of atoms in a molecule and to search for new physiologically active substances. Electronic computers enable the scientists to shorten the time needed for scientific investigations and to achieve the very greatest efficiency in their work. In the photo [not reproduced]: the institute's computer center.

USSR

COMPUTER USED TO TEST POLYMERS

Riga SOVETSKAYA LATVIYA in Russian ("The Computer Tests Materials")
5 Dec 76 p 2

[Abstract] The Institute of Polymer Mechanics of the Academy of Sciences Latvian SSR is "teaching" a computer to control a test stand at which polymer materials are subjected to stretching or twisting or to both simultaneously.

USSR

DETERMINATION OF THE COORDINATES OF STRONG EARTHQUAKES ON A MIR-1 COMPUTER IN THE RAPID REPORT SERVICE

Moscow IZVESTIYA AN SSSR, FIZIKA ZEMLI in Russian No 9, 1976 pp 87-92

BARMIN, M. P., ZAKHAROVA, A. I., MIRONOVICH, V. L., STAROVOYT, O. YE.,
CHEPKUNAS, L. S., Academy of Sciences USSR, Institute of Earth Physics imeni
O. Yu. Shmidt, Affiliate of Moscow Engineering-Physics Institute

[Abstract] The Rapid Report Service for Strong Earthquakes, the primary task of which is to determine the basic parameters of earthquakes, such as time t_0 , coordinates of epicenter ϕ, λ , depth of focus h , magnitude M and intensity I , was formed in the Soviet Union in 1948 at the Central "Moscow" Seismic Station. The values of parameters of earthquakes are found using a method of intersections with the information transmitted by seismic stations over telephone-teletype channels to the center for collection and

processing of seismologic information. The use of computers for this purpose allows subjective errors in interpretation to be eliminated, increases the accuracy of determination of the desired quantities and, furthermore, is an important stage in the direction of solution of the problem of automation of seismic observations and their processing.

There are a number of programs in the Soviet Union for the purpose of determining the basic parameters of remote earthquakes using computers, among which "Determination of the Epicenters of Earthquakes by Computer," Dokl. AN SSSR, No 2, 1963 is most widely used. However, direct use of this program in the operational mode of the rapid reporting service is difficult. This program, in use since 1965 in the generation of the operational and seismologic bulletins of the USSR, was written for the M-20, M-220 and BESM-6 computers, which the rapid reporting service does not have at the present time. Furthermore, in this program, for epicenter distances $\Delta < 105^\circ$ there is a hodograph of P waves, for larger distances-- a hodograph for PKP waves. However, the practice of seismologic observations has shown that for distances $\Delta > 105^\circ$ a station equipped with apparatus of various types (SKM, SKD, SK, SD) can record P waves at their first arrival. The absence of a diffracted P wave hodograph at distances of $\Delta > 105^\circ$ greatly complicates timely interpretation of the seismological observations.

At the "Obninsk" Central Seismic Observatory of the service, a MIR-1 computer is in operation using the program reported in "The Use of a Small 'MIR-1' Computer for Determination of the Hypocenters of Earthquakes," Poiski predvestnikov zemletryaseniya na prognosticheskikh poligonakh [Search for Predecessors of Earthquakes in Prediction Ranges], Moscow, Nauka Press, 1974. However, this program performs calculations only using the direct wave hodograph P, i.e., for earthquakes no more than 105° distant. Furthermore, the polynomial approximation of the hodograph leads to significant errors in calculation at distances outside the interval $[5^\circ - 100^\circ]$.

We have therefore written a new program, realizing the method of cross bearings on the MIR-1 computer, which eliminates these shortcomings.

Additional improvements of the input language are used. The program has been in use at the Central Seismological Observatory for two years. Results of operation of the program have been compared with the earthquake reporting bulletin, featuring statistical analysis of the epicenter coordinates of 240 earthquakes in various seismically active regions. The mean square error in the position of the epicenters is not over 1° for Stage 1 of calculation and 0.5° for Stage 2, which is quite acceptable for the small number of stations (averaging 10) and uneven distribution of the stations around the focus.

C. Astronomy and Space

USSR

ALGORITHMS FOR CALCULATION OF NAVIGATIONAL INFORMATION

Moscow ALGORITMY RASCHETA NAVIGATSIONNOY INFORMATSII (Institute of Space Studies, Academy of Sciences USSR, Preprint 251) in Russian 1975 62 pp, mimeographed

KUGAYENKO, B. V., KUZ'MINYKH, V. A., MERISOV, G. A., NAZIROV, R. R., KHAVENSON, N. G., KHATSKEVICH, I. G., EYSMONT, N. A., and EL'YASBERG, P. YE.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9G455K from the resume]

[Text] An algorithm is presented for navigational correlation of scientific information produced by long-range spacecraft (both during flybys and in orbits around the planets) and Earth satellites. The algorithms presented are used as a basis for a system of programs developed in FORTRAN intended for the performance of navigational calculation on the BESM-4 computer and the RYAD computer of the YeS unified system.

V. INFORMATION SCIENCE
A. Information Services

USSR

AUTOMATED INFORMATION SYSTEM DEVELOPED

Riga SOVETSKAYA LATVIYA in Russian ("The Electronic Library") 13 Jan 77, p 4

IL'ICHEVA, S.

[Abstract] A description is presented of the automated information storage and retrieval system utilized by the Academy of Sciences Latvian SSR for automation of scientific research. The hardware base is a type YeS (unified system) computer, which operates in the time-sharing mode. The new information system occupies a memory volume of 100 kilobytes, and is accessed through several display units in the dialogue mode. The system provides information on the content of two scientific journals, "Automation and Computer Technology," and "Semiconductor Devices." Its use is experimental at the present time. It is planned to make it operational by 1978-1979, connecting scientists at ever-increasing distances from the computer with ever-increasing volumes of information in machine memory. The system was developed in the Academy's Institute of Electronics and Computer Technology by the Department of Information System Software, under the direction of Candidate of Technical Sciences Eduard Zinov'yev.

USSR

PRINCIPLES OF CONSTRUCTION OF A DISTRIBUTED AUTOMATED DATA BANK FOR THE
STATE NETWORK OF COMPUTER CENTERS

Kiev PRINTSIPIY POSTROYENIYA RASPREDELENNOGO AVTOMATIZIROVANNOGO BANKA
DANNYKH GOSUDARSTVENNOY SETI VYCHISLITEL'NYKH TSENTROV (Academy of Sciences
UkSSR, Scientific Council on the Problem "Cybernetics," Cybernetics Institute) in Russian 1975 83 pages

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V81K]

[Text] This collection presents the results of studies of a group of scientists from organizations in Kiev and Moscow concerning the basic principles of construction of a distributed data bank for the State Computer Center network. Articles are abstracted individually.

USSR

TIME-SHARING SYSTEMS IN COMPUTER NETWORKS

Kiev TEKHN. I MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH [Software and Hardware for Organization of Dialogue in Computer Systems. Collection of Works] in Russian 1975 pp 30-33

NIKULIN, V. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V840 by A. Krasilov]

[Text] A discussion is presented of the structure of a computer network with the following levels: terminal, system of computer workers, control of network and communications system. An operating session between a user and the network consists of the following stages: establishment of physical communications with a local processor, dialogue between the user and this processor, dialogue between this processor and the operating machine, dialogue of the user with the operating machine. The need is noted for a universal programmable terminal interface processor.

USSR

USE OF IMITATION SYSTEMS FOR PLANNING OF DATA BANK STRUCTURES

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA [Data Processing on Third Generation Computers. Collection of Works] in Russian 1976 pp 64-71

GOLOVANOV, O. V., YEFANKIN, G. A., and SMIRNOV, V. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V789]

[Text] It is suggested that the data bases making up an information bank be maintained by means of an IMS/360.

CZECHOSLOVAKIA

UDC [025.4.03:676.815](437)

A REVIEW OF THE CONTEMPORARY STATE OF MECHANIZED INFORMATION RETRIEVAL
SYSTEMS USING CARDS

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA Series 1 No 11, 1976 pp 20-22
manuscript received 17 Mar 75

KHIL'MAR, I., CSSR

[Abstract] This article analyzes three types of information retrieval systems (superposition card systems, edge perforated card systems and slit card systems), which can be introduced in daily information practice with minimum hardware expenditures. It is intended to inform specialists interested in such systems of the latest capabilities for their practical utilization, based on the results produced in recent years in this area by the research arm of the Central Administration for Scientific, Technical and Economic Information in Prague. Due to their availability, exceptional simplicity and flexibility, limited initial costs, speed and particularly economy of operation, these mechanical, noncomputerized systems should be widely used. They can be used at enterprises for personnel accounting, are irreplaceable for use in the organization of reference card files and provide for independent functioning of simplified retrieval systems as well as mutual system compatibility. They can be easily combined with computerized systems. Their development and improvement should be continued.

POLAND

UDC 519.2

MODERNIZING AN INFORMATION SYSTEM AT AN ENTERPRISE--SOME PROBLEMS IN ORGANIZATION

PR. NAUK. AE WROCLAWIU in Polish No 65, 1975 pp 31-49

NOWICKI, ADAM

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V747 by T. N. Sidorova]

[Text] Some problems in organizing the modernization of an enterprise information system are discussed. The introductory chapter gives a definition of modernizing a computer system. Then an examination is made of the chief stages in modernization: 1) identification of the actual computer system; 2) analysis; 3) description; and 4) operation of the modernized system. The last chapter acquaints the reader with the essentials of organizing the modernization of an enterprise information system.

B. Information Theory

USSR

A DISTRIBUTED DATA BASE AND ITS SERVICING BY THE DATA BASE CONTROL SYSTEM (SUBD)

Kiev PRINTSIPIY POSTROYENIYA RASPREDELEN. AVTOMATIZIR. BANKA DANNYKH GOS. SETI VYCHISL. TSENTROV [Principles of Construction of a Distributed Automated Data Bank in the State Network of Computer Centers. Collection of Works] in Russian 1975 pp 71-82

AVINKOV, V. M.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V763 by V. Tkach]

[Text] A statement is presented of the problem of optimization of the performance of jobs with a distributed data base. The overall data base combines the network of computer centers, which can transmit data back and forth between the base and the archives. Transmission is always in batches. The cost function of performance of the task depends on the distribution of the parts of the data base among the computer centers of the network, the cost of transmission of data between computer centers, as well as the distribution of jobs among computer centers. Furthermore, the distribution of elements of the data base among computer centers of the network follows the limitations of the volume of information which can be stored in a computer center of this type. In its most general statement, optimization of the cost function of performance of the task consists in seeking out the minimum of a quadratic function of integer variables with quadratic limitations. If we assume that the computer centers of the network preprocess the information and requests for each job are sent to all computer centers evenly, optimization is simplified and is reduced to a problem in linear integer programming.

USSR

GENERAL PRINCIPLES OF ORGANIZATION OF THE FUNCTIONING OF A DISTRIBUTED DATA BANK IN A NETWORK OF COMPUTER CENTERS

Kiev PRINTSIPIY POSTROYENIYA RASPREDELEN. AVTOMATIZIR. BANKA DANNYKH GOS. SETI VYCHISL. TSENTROV [Principles of Construction of Distributed Automated Data Bank for the State Network of Computer Centers. Collection of Works] in Russian 1975 pp 48-59

AFANAS'YEV, V. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V747 by V. Tkach]

[Text] The general outline of the principles of functioning of a distributed automated data bank (RABD) in a computer center network (SBTS) is presented. The hierarchical functional structure of the RABD is presented at the level of information processes, and also at the level of applications. The interaction of a local data bank of an individual computer center with the local operational system of this computer center is described, as well as with the distributed operating system of the network (ROSS). The basic services supporting the functioning of the RABD are listed and the capabilities of these services and users for accessing the data in the bank are described.

USSR

BASIC PRINCIPLES OF CONSTRUCTION AND SOFTWARE FOR ORGANIZATION OF DIALOGUE IN SYSTEMS FOR AUTOMATION OF TESTING

Kiev TEKHN. I MAT. SREDSTVA ORGANIZ. DIALOGA V VYCHISL. SISTEMAKH [Hardware and Software for Organization of Dialogue in Computer Systems] in Russian 1975 pp 8-19

ZABOLOTNYY, V. I., MARCHENKO, O. V., RUKHLYADEV, YU. N., SHATALOV, V. N., and SHUL'GA, V. G.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V804 by A. Krasilov]

[Text] The system created, based on an M-6000 computer, is designed for processing of information taken from low-frequency sensors and recorded on a magnetic medium. Primary processing includes interpretation of the structure of the recording, consideration of calibration characteristics and substitution formulas, production of unmeasured parameters. The data are presented in 9-10 position numbers. A brief study is made of the

functioning of the system in the dialogue mode. The system is served by special software, the procedures of which are listed. An example is presented of the dialogue program, the compiler functions are described, the questions asked by the system and archive methods are listed, supervisor control operators are given, all of which defines the secondary processing of information. The results of processing are recorded on plotters and a wide-format printer.

USSR

PROVISION OF DATA SAFETY AND TESTING OF THE CONDITION OF DATA

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA [Data Processing on Third Generation Computers. Collection of Works] in Russian 1976 pp 88-93

SOLOV'YEV, V. V.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V783]

[No abstract]

VI. THEORETICAL FOUNDATIONS
A. Game Theory and Operations Research

USSR

UDC 51:681.3:007.5

ON THE APPROACHES AND ALGORITHMS FOR SOLVING SEVERAL OPTIMIZATION PROBLEMS
IN AUTOMATING THE DESIGN OF ELECTRONIC COMPUTERS AND SYSTEMS

Kiev KIBERNETIKA in Russian No 5, Sep/Oct 76 pp 61-71 manuscript received
12 Mar 76

GULYANITSKIY, LEONID FEDOROVICH, graduate student [aspirant] of Kiev State University, KASPSHITSKAYA, MARIYA FADEYEVNA, candidate of physico-mathematical sciences, senior scientific associate of the Institute of Cybernetics of the Academy of Sciences Ukrainian SSR, Kiev, SERGIYENKO, IVAN VASIL'YEVICH, doctor of physico-mathematical sciences, head of a department of the Institute of Cybernetics of the Academy of Sciences Ukrainian SSR, Kiev

[Abstract] The authors list a survey of published papers on optimization problems that arise during the stage of automating the structural design of electronic computers and systems. They classify the methods for solving these problems and briefly describe the algorithms from the assigned classes. They also discuss several questions which arise in making the mathematical formulations of these problems. Because of the lack of sufficient data it is difficult to make a solidly based selection of a particular method for implementation in a system of automated planning; however, the authors feel that the iteration methods are the most promising ones since they have been proven in practice. These methods allow the solution obtained to be improved within the framework of the assigned indices of effectiveness and assigned machine-time resources. They can be used not only for solving problems of practical interest but also as a means for producing statistical data on utilizing the optimization methods for solving various classes of problems. Such data can be employed as a basis for improving existing algorithms and developing new highly effective methods of discrete optimization. References 41: 36 Russian, 5 Western.

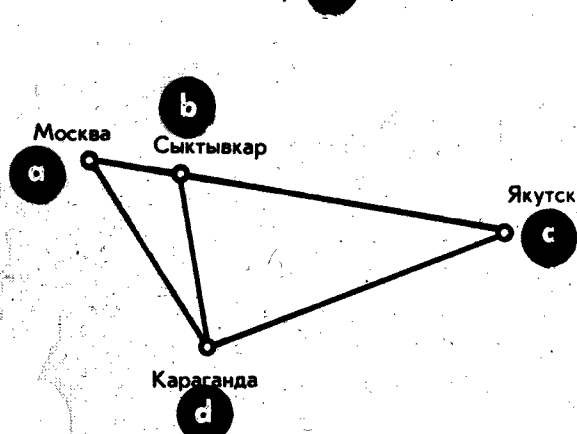
SYSTEMS MODEL OF A COMPUTER NETWORK

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 3-9
manuscript received 6 Apr 76

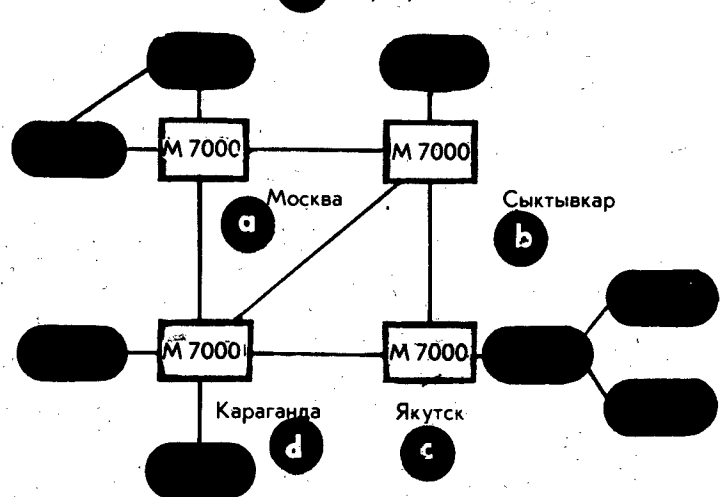
DROZHZHINOV, VLADIMIR IVANOVICH, engineer, USSR Academy of Sciences Institute of Applied Mathematics, Moscow, and MYATLIN, ANATOLIY NIKOLAYEVICH, doctor of engineering sciences, USSR Academy of Sciences Institute of Applied Mathematics, Moscow

[Abstract] The systems approach is used to describe a model of a computer network which is based on an analysis of existing networks and which embraces the hardware and software aspects of the network without reference to the specific design of the network and its use. The model is intended as a methodological foundation for creating future computer networks. The network is described from the viewpoint of its external and internal structure, as well as that of the system of which it itself is a subsystem. The network is regarded externally as an interrelated collection of hardware viewed from two aspects, the geographical and physical. Geographically, the network is a set of geographically indivisible points of information sources and users named after their geographical location and linked together in a specific manner by physical exchange channels and/or communication lines. The geographical graph of the network is made up of these points and the links between them. Physically, the network is a set of physically indivisible points representing physical hardware named by its manufacturers. This set is linked together by electrical wires. The physical graph of the network is made up of this hardware and the links between them. The following are examples of geographical and physical graphs of a hypothetical computer network:

Географический граф



Физический граф

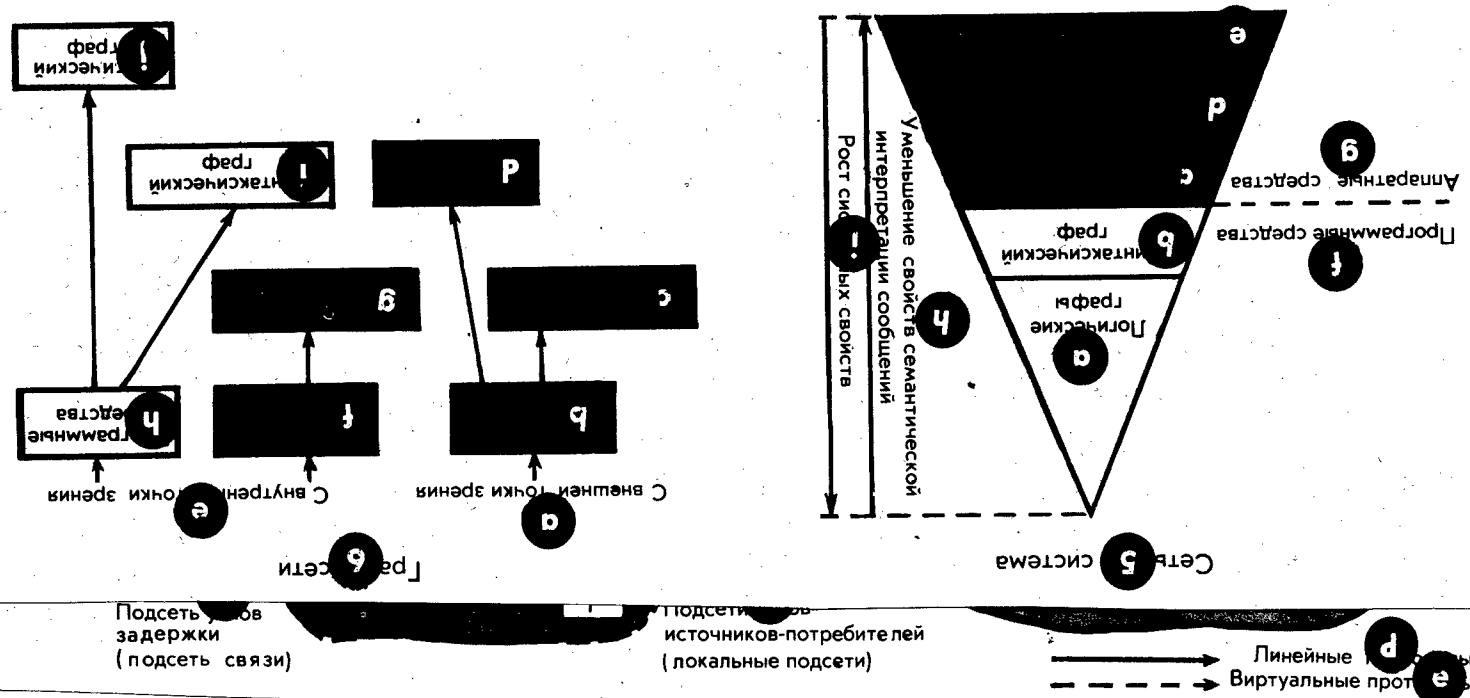


Key:

- | | |
|-----------------------|-------------------|
| 1. Geographical graph | 2. Physical graph |
| a. Moscow | a. Moscow |
| b. Syktyvkar | b. Syktyvkar |
| c. Yakutsk | c. Yakutsk |
| d. Karaganda | d. Karaganda |

The geographical graph provides the following characteristics for a network under development: The optimum topology of the network, the number of time zones crossed by the network, the cost of its communication lines or the cost of leasing these lines, the cost of transmitting communications in the network, the network's carrying capacity, the lag time in the network, and the speed of data transmission between points in the network. The physical graph provides the following characteristics of the network: The make-up of the network with regard to the types of computers which are part of it, the cost of the network's hardware, and the physical topology of the network. The internal structure of the network is analyzed at both the hardware and software level. A functional graph of the network is constructed to show the interrelationship of functionally indivisible hardware components, such as information-source and -user components, information delay components, and linking hardware. Functional indivisibility here means that one or more functions are performed at one point on the physical graph or through one physical linking component. The functional graph of a network is created on the basis of the spatial distribution of linked computers, using the geographical graph, and the nature of information flows proposed for the network. Creating this graph involves selecting a method of transmitting communications which is optimum with respect to transmitting costs, efficient throughput, modular construction, resistance to failure, and logical complexity. A syntactical graph is used to plot the relationships between the network's software. Physically this software is located at points on the functional graph. The subjects of information processing are termed "users' processes," and the network provides software for both carrying out users' processes and for providing for exchange of communications between them--the network's "postal service." The latter entails control over communication flow, control over communication sequence, and gathering of statistical data, whereas the former entails functions performed by data processors. The specific relationships between users' processes and postal service processes are called "proceedings," which are broken down into "direct-line" and "virtual" and are defined as the set of rules for logical and time synchronization of communication exchange between points on the syntactical graph and the set of agreements on the format of communications transmitted between these points. The functional purpose of the network as a whole is determined by these proceedings. A syntactical graph for a hypothetical computer network is shown below, along with a functional graph. Linear proceedings involve direct interaction between points on the syntactical graph, and virtual proceedings interaction between points on the syntactical graph after intermediary interaction through direct-line (linear) proceedings. A logical graph is employed to plot these types of interaction. The logical graph of user's processes is determined by the set of processes of a specific user which

interact in the network with a specific relationship between source and consumer communications in the network. The network as a system is shown



Key:

3. Functional graph

- a. Moscow
- b. Syktyvkar
- c. Yakutsk
- d. Karaganda
- e. Subnetwork of delay components (communications subnetwork)
- f. Subnetworks of source and consumer components (local subnetworks)

4. Syntactical graph

- a. Processes of user "i"
- b. Network's postal service
- c. Processes of user "j"
- d. Direct-line proceedings
- e. Virtual proceedings

to have a hierarchical structure expressed in terms of all these graphs. Each successive level is based on the preceding and plays a greater role in formation of the system, as shown below. There is an increase in systems features from the bottom of the pyramid to the top, whereas there is a decrease in possibilities of semantic interpretation from top to bottom. The hardware-software interface is indicated by the dotted line. Network graphs are shown, expressing the relationship between hardware and the geographical and physical graph when the network is viewed externally, and the relationship between hardware and the functional graph and software and the syntactical and logical graphs when the network is viewed internally.

Key:

- | | |
|---|----------------------------|
| 5. Network as a system | 6. Network graphs |
| a. Logical graphs | a. From external viewpoint |
| b. Syntactical graph | b. Hardware |
| c. Functional graph | c. Geographical graph |
| d. Physical graph | d. Physical graph |
| e. Geographical graph | e. From internal viewpoint |
| f. Software | f. Hardware |
| g. Hardware | g. Functional graph |
| h. Reduction in properties of
semantic interpretation of
communications | h. Software |
| i. Increase in systems pro-
perties | i. Syntactical graph |
| | j. Logical graph |

The network model suggested makes it possible to isolate individual problems in designing a computer network and to determine the place of these problems in the over-all task of designing the network. The model also provides a method of comparing networks of different architecture, based on the single notion of network graphs. Figures 8; references 15; 7 Russian, 8 Western.

USSR

UDC 62-50

SEVERAL MATHEMATICAL MODELS FOR PLANNING THE COMPUTING PROCESS

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNIЧЕСКАЯ KIBERNETIKA in Russian No 5, Sep/Oct 76 pp 113-119 manuscript received 17 Mar 75

KHMEL'NIK, S. I., LIVSHITS, V. A., and OSTROVSKIY, V. U., Moscow

[Abstract] The authors examine problems concerned with planning the priority for completing information-related programs with the simultaneous selection of an exchange strategy between the two memory levels. They propose various indices for quality of planning which take into account the volume of the computer core memory, the time of data arrival in this memory and the number of exchanges between memory levels. They describe the mathematical formulations of these problems which are reduced to problems of integral (Boolean) programming with linear and parabolic constraints. They demonstrate their solution methods. Figure 1; references 7: 6 Russian, 1 Western.

USSR

UDC 518.74

OPTIMAL LOAD OF COMPUTER CAPACITIES IN MULTIPROCESSOR SYSTEMS

Kiev SISTEMY PROM. KIBERNET., SBORNIK [Industrial Cybernetic Systems. Collection of Works] in Russian 1975 pp 22-27

MOVA, V. V., PONOMARENKO, L. A., and PONOMARENKO, T. B.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V932 by V. Lopatin]

[Text] The widespread acceptance and accessibility of computers makes it possible to devise an entire complex of computers for solving large classes of problems. The building of such complexes of computers makes it extremely urgent to solve problems of the optimal load of system capacities. The article attempts to solve the problem of optimal loading of a system as a function of a developing concrete situation under the condition that the flows of requests for processing are random.

USSR

ALGORITHM FOR DIRECTED SORTING OF VERSIONS FOR OPTIMAL TOPOLOGICAL PLACEMENT OF A NETWORK OF COMPUTER CENTERS

ADAPTIV. SISTEMY AVTOMAT. UPR. RESP. MEZHVED. NAUCH.-TEKHN. SB. [Adaptive Automatic Control Systems. Collection of Works] in Russian 1976 No 4 pp 120-125

ZAYCHENKO, YU. P., and ZINCHENKO, N. G.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V672 by the authors]

[Text] An algorithm is suggested for directed sorting of versions allowing determination of the optimal structure of a time-sharing computer center network based on the criterion of minimum adjusted cost for creation of the communications network and computer centers. The algorithm is used to plan regional computer center networks.

USSR

UDC 519.2

METHOD OF COMPARATIVE ESTIMATE OF THE EFFECTIVENESS OF SOLVING PROBLEMS WITH VARIOUS COMPUTING DEVICES

TOCHNOST' I NADEZHNOST' KIBERNET. SISTEM. RESP. MEZHVED. SB. [Accuracy and Reliability of Cybernetic Systems. Republic Interdepartmental Collection] in Russian No 4, 1976 pp 45-51

VERLAN', A. F., and GULYAYEV, V. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V740 Author's Abstract]

[Text] The main principles of a method of comparative estimate of the effectiveness of solving problems with various computing devices are presented; the method is founded on an analysis of all stages of the computing process. An example of its use in solving one class of problems with analog, digital and hybrid computing devices is presented.

USSR

ONE PROBLEM OF ANALYSIS OF THE CHARACTERISTICS OF FUNCTIONING OF COMPUTER SYSTEMS

Kiev PRIMENENIYE I PROYEKTIR. MINI- I MIKROEVM [Application and Planning of Mini and Microcomputers. Collection of Works] in Russian 1975 pp 28-35

KASYAN, A. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V649 by O. Belkin]

[Text] An analysis is presented of Erlang models of queueing with waiting and limitations on the time of waiting. The studies are performed using the method of virtual waiting time. Formulas are presented for calculation of the mean waiting time, probability of loss of a job, probability that the system will not be busy and mean queue length.

USSR

THE EFFECTIVENESS OF DIGITAL COMPUTERS CONTAINING OPERATIONAL DEVICES BASED ON DECIMAL OPTICAL-ELECTRONIC ADDERS

Leningrad METODY MASH. PROYEKTIR. TSIF. USTROYSTV I SISTEM [Methods of Machine Planning of Digital Devices and System. Collection of Works] in Russian 1976 pp 80-84

NATROSHVILI, O. G.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V666 by V. Mikheyev]

[Text] A method is presented for comparison of the effectiveness of functioning of digital computers containing operational devices based on electronic and optical-electronic decimal adders. The effectiveness criteria selected are: number of elements of the adder, speed, probability of failure-free operation.

USSR

COMPARISON OF THE PRODUCTIVITY OF THE BESM-6, BURROUGHS 6700 & UNIVAK 1108
COMPUTERS ON CERTAIN SIMPLE TASKS

Moscow VOPR. SISTEM. PROGRAMMIR. [Problems of Programming Systems. Collection of Works] in Russian No 2, Moscow University Press 1976 pp 91-93

VAKSTREM, LARS and YALMAR, VIKTOR

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V667 by V. Mikheyev]

[Text] A table of results of measurement of the computation time of 10 simple arithmetic expressions programmed in ALGOL and FORTRAN on the BESM-6, Burroughs B6700 and Univak 1108 computers is presented.

The following conclusions are drawn: 1) for these problems in FORTRAN, the UNIVAK 1108 is 1.2-1.7 times faster than the BESM-6, but in ALGOL, the BESM-6 is 3.6-13.5 times faster than the UNIVAK 1108; 2) in ALGOL, the BESM-6 is 1.9-3.2 times faster than the Burroughs B6700 but in FORTRAN the Burroughs B6700 is 1.0-2.2 times faster than the BESM-6. It is noted that the study of computer productivity performed in this work is relative in nature and does not yield a complete conception of the capabilities of the machines.

USSR

THE REQUIREMENT FOR STATEMENT OF THE PROBLEM OF OPTIMIZATION OF LONG-TERM
PLANNING OF COMPUTER COMPLEXES

Kiev IZPOL'Z. EKON.-MAT. METODOV V PLANIR. OTRASLEY NAR. KH-VA [Use of Mathematical Economics Methods in Planning of Branches of the National Economy. Collection of Works] in Russian 1975 pp 38-45

KOVALEVA, T. I.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V647 by V. Zhdanov]

[Text] A study is made of the problem of calculation of the necessary number of computers, and existing methods are analyzed. The need is noted for the use for this purpose of dynamic models, particularly the method of sequential analysis of alternatives. The problem of optimization of long-term planning of the development of computer complexes is formulated as follows: for the next 15 to 20 years, determine the types and numbers of computers in each of the years of the plan period required so that the optimality criterion used (total adjusted costs of capital investments and operating expenses over the entire period of time) is minimized.

USSR

USE OF MODELING IN THE CONSTRUCTION OF TESTS FOR CHECKING COMPUTER SECTIONS

TOCHNOST' I NADEZHNOST' KIBERNET. SISTEM. RESP. MEZHVED. SB. [Accuracy and Reliability of Cybernetic Systems. Collection of Works] in Russian No 4, 1976 pp 7-82

GULYAYEV, V. A., and GAIBNAZAROV, S. D.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V645]

[Text] A study is made of certain problems of improvement of the method of modeling in the direction of reducing modeling time and considering the peculiarities of operation of systems with memory.

USSR

UDC 519.2

PROBABILITY OF SURVIVAL OF A SYSTEM PREPARING FOR THE ONSET OF A CATASTROPHE

MODELI ORGANIZ., UPR. I METODY IKH ISSLED., SBORNIK [Models of Organization and Control and Methods of Investigating Them. Collection of Works] in Russian Ufa 1975 pp 101-109

BRUSILOVSKIY, P. M.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V369 by I. Kovalenko]

[Text] The following model of preventing catastrophes is proposed. Let t be the required time of system functioning. At independent random instants X_i with given distributions, catastrophes set in if measures are not taken to prevent them. These measures are characterized by random variables Y_i : the i -th catastrophe will be prevented as soon as $Y_i < X_i$. The distribution of Y_i depends on the reserve allotted to prevent the i -th catastrophe. An approach is formulated for solving the problem of optimal distribution of the existing reserve R to minimize the probability of even one catastrophe in the time t . A reasonable application is to environmental problems.

USSR

UDC 51:681.3.01

ON THE PROBLEM OF THE AUTOMATED GENERATION OF COMPUTER CIRCUIT TESTS

Kiev KIBERNETIKA in Russian No 5, 1976 pp 77-83 manuscript received 12 Jul 74

PETROSYAN, ASHOT VEZIROVICH, candidate of physico-mathematical sciences, chief of a department of the Yerevan Scientific Research Institute of Mathematical Machines, SHUKURYAN, YURIY GAYKOVICH, candidate of physico-mathematical sciences, chief of a department of the Yerevan Scientific Research Institute of Mathematical Machines, LAZARYAN, EDUARD ARAMOVICH, candidate of technical sciences, chief of a sector of the Yerevan Scientific Research Institute of Mathematical Machines

[Abstract] The authors describe an approach to solving the problems which arise in automating the generation of tests for combination circuits based on the analysis of paths in the circuit structure. They give the mathematical basis of the method and information on its practical utilization. The algorithms given here can be applied to consecutive circuits in the form of iterative combination circuits and may be used for the generation of tests that detect short circuits between contacts in the circuit. This generation system today is employed in disk operating systems of computers and is undergoing experimental testing. References 9: 8 Russian, 1 Western.

USSR

UDC 518.74

THE CHARACTERISTICS OF USING BASIC LOGIC CELLS IN THE SYNTHESIS OF THE STRUCTURES OF DYNAMIC METAL-DIELECTRIC CONDUCTORS FOR LARGE-SCALE INTEGRATED CIRCUITS

Kiev PRIMENENIYE I PROYEKTIR. MINI- I MIKROEVM, SBORNIK [Application and Design of Mini- and Micro-computers, Collection of Works] in Russian 1975 pp 45-55

GILYAROVSKAYA, YE. B., GRACHEV, I. F., and DRYAPAK, A. F.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V791 by I. Misochko]

[Text] Widespread use has recently been found for computers that have common main-line data-exchange channels. The authors examine several problems of application for organizing these channels for large-scale integrated circuits (LSI) with a metal-dielectric-conductor (MDC) structure. Several variants of buffer circuits operating in one data transmission channel are examined. A non-standard buffer variant is described; this variant is more economical with respect to circuitry and computational use when transmitting information from several units on a single LSI circuit over a channel.

USSR

UDC 518.74

STRUCTURAL ORGANIZATION OF MICROPROCESSORS

Kiev PRIMENENIYE I PROYEKTIR. MINI- I MIKROEVM, SBORNIK [Application and Design of Mini- and Micro-computers. Collection of Works] in Russian 1975 pp 56-68

KOBYLINSKIY, A. V., SABADASH, N. G., and TEMCHENKO, V. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V792 by I. Misochko]

[Text] Possible structures of microprocessors (MP) constructed with large-scale integrated circuits are examined. A comparative analysis of MP structures with different degrees of integration is presented, and several methods of stack organization of memory in MP with a moderate level of integration are described. The authors view as most promising the development of MP with moderate and high levels of integration using individually executed large-scale integrated circuits of the operational unit and the control unit.

USSR

UDC 518.74

TECHNICAL ASPECTS OF INTERFACING MINI-COMPUTERS WITH THIRD-GENERATION COMPUTERS

Kiev PRIMENENIYE I PROYEKTIR. MINI- I MIKROEVM, SBORNIK [Application and Design of Mini- and Micro-computers. Collection of Works] in Russian 1975 pp 35-44

IVANOV, V. V., SMICHKUS, YE. A., and IVANOV, V. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V790 by I. Misochko]

[Text] Several methods of interfacing structurally dissimilar computers in order to construct computer systems are examined. Two methods of organizing the intercomputer link are described--one with an input/output interface and another which utilizes an internal memory interface. The authors hold the first method to be best for mini-computers and they describe two ways of achieving it--firstly, using a common external memory and secondly, using an input/output interface adapter. Examples of existing computer systems constructed under the arrangements described are presented.

POLAND

UDC 519.2

ORGANIZING MEMORY STRUCTURES FROM THE STANDPOINT OF A CONVERSATIONAL TIME-SHARING COMPUTER SYSTEM

PR. NAUK. AE WROCLAWIU in Polish No 65, 1975 pp 89-107

MACIASZEK, LESZEK

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V745 by T. N. Sidorova]

[Text] The role and place of a conversational time-sharing computer system (CTSCS) are analyzed. The physical, functional and technological organization of memory in computer systems are characterized. Four levels of organization in the technological layout of memory organization in the computer systems are distinguished, namely, address, multiprogram, hierarchical and virtual memories. Special attention is placed on the problem of hierarchical and virtual memories as typical of CTSCS. It is shown that it is possible to establish the integration of these memory levels in the CTSCS, assuming that virtual memory must play a leading role. The problem of optimizing hierarchical memory and transforming virtual address into a system of virtual unsegmented memory is examined.

SCATTER STORAGE

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 99-102
manuscript received 4 May 76

YAGEL'SKIY, ROMUAL'D, junior scientific associate, Gdansk University, Gdansk
Polish People's Republic

[Abstract] A survey and analysis are given of the method of scatter storage, used as early as 1954 in developing the assembler for the IBM 701 computer. It is defined as one of the methods of arranging for the retrieval of information stored in a memory with direct access. Interest in this method has grown because of the wide use of disk-type memory devices, since use of this method of organizing files makes it possible to reduce the time required for record retrieval to a minimum. The fundamental principle of this method is the reflection of control words in addresses, with elimination of uncertainty arising from synonyms. Each recorded entry is filed by an address, which is obtained by processing a control word, i.e., an element of the record making it possible to identify this record. Each record is regarded as an ordered pair consisting of the record's control word and the remaining information in the record. The process of determining the address for a specific file entry in the memory is called "hash coding," whereby a determination is made of the function reflecting a random control word drawn from the set of control words in a specific file in an address drawn from the set of addresses in the memory. A brief description is given of familiar methods of reflecting control words in addresses and of measures making it possible to use scatter storage in a situation of uncertainty, i.e., in a state of synonymy. Methods treated are: The method of division, the randomization method, the sign analysis method, the stacking method, the method of changing the base of the number system, and algebraic coding. Methods of resolving conflicts are also discussed, such as recording synonyms in an added section of the memory set aside for a specific file and recording synonyms in unoccupied sections of the memory. The average length of the retrieval process, i.e., the average number of checks necessary to find the record identified by the control word in the memory, is used as the criterion for determining the best method of scatter storage. Two methods of retrieval, linear and chain-type, are compared in tabular form with reference to the coding method employed. Selection of the best method for a specific file is best made on the basis of modeling different methods and determining how they interact with the file's set of control words. The scatter storage method is being more widely used to develop software for data banks. Figures 1; tables 1; references 15: 4 Russian, 3 Polish, 8 Western.

USSR

UDC 51:681.332.3

SYNTHESIS OF MULTIFUNCTIONAL INTEGRATED MEMORIES

Kiev KIBERNETIKA in Russian No 5, 1976 pp 90-96 manuscript received
12 Jul 74

BALASHOV, YEVGENIY PAVLOVICH, doctor of technical sciences, professor of Leningrad Electrical Engineering Institute, VLADIMIROV, YEVGENIY YEVGEN'-YEVICH, chief designer of the GSKTB [possibly State Special Design-Technological Bureau] for Planning of Calculators, Leningrad, TIMOFEYEV, ALEKSANDR ORESTOVICH, candidate of technical sciences, docent of Leningrad Electrical Engineering Institute

[Abstract] Multifunctional integrated memories may be used effectively in systems of information gathering, registration and primary processing. The authors of this article analyze an integrated memory and demonstrate its functional possibilities; they also synthesize several multifunctional integrated elements. The elements and equipment examined in this article do not exhaust all the possibilities inherent in multifunctional integrated memories. The procedure used here may be employed also to produce other versions of multifunctional integrated memories based on the requirements assigned. The authors cite examples which illustrate the procedures involved. Figures 4; tables 9; references 7 (Russian).

USSR

METHODS OF CLEARING MEMORY IN THE LISP PROGRAMMING SYSTEM FOR THE BESM-6

TR. VYCHISL. TSENTRA. AN GRUZSSR in Russian 1975 Vol 15 No 1, pp 138-145

SILAGADZE, G. S., and KIKVADZE, K. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V800].

[Text] During the operation of the system, memory is expended freely. When memory is required, the system occupies new (free) locations in the corresponding sector, regardless of whether the old locations are still needed.

When the system discovers that any sector is exhausted, calculations are halted and the system transfers control to a scavenger program, which determines which memory locations contain no information needed for subsequent work, declares them free for reuse and continues computation from the point of interruption.

USSR

UDC 519.2

EFFECTIVENESS OF ERROR DETECTION IN ADDRESSING BY THE MEMORY PROTECTION
SYSTEM OF MULTIPROGRAMMING DIGITAL COMPUTERS

AVTOMATIZIR. SISTEMY UPR. I PRIBORY AVTOMATIKI. RESP. MEZHVED. TEMAT. NAUCH.-
TEKHN. SB. [Automated Control Systems and Automation Instruments, Republic
Interdepartmental Thematic Scientific-Technical Collection] No 37, 1976
pp 94-100

METESHKIN, A. A., RYABUKHA, N. D., and TOLSTOKHAT'KO, V. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V742
Author's Abstract]

[Text] Working formulas are derived for estimating the effectiveness of
error detection in addressing by the memory protection system of multi-
programming digital computers. The effect of error multiplicity, address
length and size of active program sections on effectiveness in detecting
addressing errors was investigated.

USSR

ORGANIZATION OF A TIME-SHARING SYSTEM BASED ON A BESM-6 COMPUTER WITH THE
DUBNA OPERATING SYSTEM

Kiev VOPR. SOZDANIYA RAS I GOS. SETI VYCHISL. TSENTROV [Problems of Creation
of RAS [Republic Automated System] and the State Network of Computer Centers.
Collection of Works] in Russian 1976 pp 21-26

STOGNYY, A. A., NIKULIN, V. N., PERCHUK, V. L., OFENGENDEN, Z. F.,
STARCHENKO, YU. V., and GOLENKOV, YE. A.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V818 by
V. Mikheyev]

[Text] A brief description is presented of a time-sharing system in which
the central computer is a BESM-6, and the intellectual terminals are MIR-2
computers. Remote transmission of data is through a "spin-6" switched
telephone line data transmission apparatus with a transmission rate of 600-
800 bits per second. The basic operating system of the BESM-6 is the
DUBNA OS, which has the property of multiple access and allows organization
of parallel branches in a problem and in information exchange with non-
standard terminal devices. References 11.

USSR

PRODUCTION OF STATISTICS FOR ACCELERATION OF RUNNING OF PRIVILEGED OPERATIONS WHEN OPERATING UNDER THE CONTROL OF THE DOS-2 OPERATING SYSTEM ON THE M-4030 CONTROL COMPUTER COMPLEX

TD. IN-TA ELEKTRON. UPRAVL. MASHIN in Russian No 52, 1975 pp 24-28

ZAKHAROV, V. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V836]

[Text] The operating systems DOS ASVT, DOS-2 and other modern operating systems are large, complex systems. To study them and generate programs which allow these systems to operate in specific models of computers, it is convenient to use the method of collection of statistical data on certain parameters of the operating system. Data on program interruptions during operation under the control of the DOS-2 operating system on the M-4030 computer are of interest. In order to collect such data, a program called "STATIST" was written. The data produced were used to generate programs supporting the operation of the DOS-2 system in the M-4030 control computer complex, as a result of which it became possible to organize accelerated processing of the most frequently encountered program interruptions in the newly generated system.

USSR

UDC 681.142.2

ORGANIZATION OF A LIBRARY OF STANDARD INTERCHANGEABLE PROGRAMS FOR COMPUTERS WITH FIXED PAGES

Moscow PROGRAMMIROVANIYE in Russian No 5, Sep/Oct 76 pp 52-58 manuscript received 13 Feb 76

DADI, K., DADI, L., MATEYEVA, A., and SALAMATIN, I. M.

[Abstract] This article presents a method of organization of libraries of standard programs represented in binary form for the TRA-1001 and similar computers (such as the PDP-8). The rules for writing standard programs in SLANG are presented. The programs are oriented toward use in the mode of dynamic distribution of memory, which is suitable for independent debugging due to the possibility of using an absolute load. It is compared with the CEC system, oriented to the SABR assembler. The most significant properties of the library described are: 1) the possibility of its use in the dynamic memory distribution mode; 2) the possibility of using the library for computers with a main frame memory volume of 4K; 3) the absence of a stage of coding of the program in an intermediate language. SP, introduced to the main memory as an absolute load beginning at address AT requires no processing for its use. This allows independent debugging of the SP. References 7: 4 Western, 3 Russian.

USSR

A MAGNETIC TAPE DATA ARCHIVE

Kiev VOPR. SOZDANIYA RAS I GOS. SETI VYCHISL. TSENTROV [Problems of Creation of RAS [Republic Automated System] and the State Network of Computer Centers. Collection of Works] in Russian 1975 pp 58-70

OLENIN, M. V.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V830 by V. Mikheyev]

[Text] A description is presented of the DATA ARCHIVE program system for magnetic tape data files within the framework of the DUBNA operating system for the BESM-6 computer, as well as the ARCHIGRAPH program system, allowing recording, storage and reading from the archives of data files as well as named files of images formed on the display screen. It is noted that with the disc version of the "DUBNA" operating system, DATA ARCHIVE can be used to organize magnetic disc archives, greatly increasing the effectiveness of operations with the data.

USSR

UDC 518.74

SELECTION OF A COMMAND SYSTEM FOR SPECIALIZED DIGITAL COMPUTERS

IZV. LENINGR. ELEKTROTEKH. IN-TA [News of Leningrad Electrical Engineering Institute] in Russian No 187, 1976 pp 17-20

BOGOSLOVSKAYA, G. V., and VARLINSKIY, N. N.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 8, 1976 Abstract No 8V789 Authors' Abstract]

[Text] A description is given of algorithms for selecting a command system, effective in terms of memory, for a specialized digital computer that is part of a control system.

USSR

TWO METHODS OF ORGANIZATION OF COMPUTER-COMPUTER COMMUNICATION PROCEDURES
AND PECULIARITIES OF THE NETWORK ASSIGNMENT LANGUAGE

Kiev VOPR. SOZDANIYA RAS I GOS. SETI VYCHISL. TSENTROV [Problems of Creation
of RAS [Republic Automated System] and the State Network of Computer Cen-
ters. Collection of Works] in Russian 1976 pp 113-122

NIKOLENKO, D. I.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V820 by V.
Mikheyev]

[Text] A comparison is presented of two methods of organization of communi-
cations between computers: 1. Communication of the computers at the level
of terminals; 2. Communications of the computers at the level of a standard
transportation protocol. The promise of the second method is noted from
the standpoint of the capabilities of the software of the network. Char-
acteristic peculiarities of the language of assignment of the network are
studied for various methods of organization of computer-computer communica-
tions.

USSR

RANKLESS NONPOSITIONAL REPRESENTATIONS OF NUMBERS FOR ONE CLASS OF SYSTEMS
OF BASES

TR. VYCHISL. TSENTRA. AN GRUZSSR [Works of the Computer Center of the
Academy of Sciences Georgian SSR] Vol 15 No 2, 1975 pp 5-11

AKUSHKIY, I. YA., and KHATSKEVICH, V. KH.

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V688]

[No abstract]

VII. GENERAL INFORMATION
A. Conferences

USSR

CONFERENCE ON THE EFFECTIVENESS OF ASU'S

Moscow EKONOMICHESKAYA GAZETA in Russian No 7, Feb 77 p 12

BODYANSKAYA, T., and SIMCHERA, V.

[Text] An All-Union Scientific-Practical Conference on the Problems of Increasing the Effectiveness of Automated Management Systems in Associations and Enterprises took place in Uzhgorod. The conference was organized by the Central Board of Directors of the Scientific-Technical Society of the Instrument Building Industry; the Zakarpatskaya Oblast' Committee of the Communist Party of the Ukraine; the Ministry of Instrument Building, Automation Equipment, and Control Systems; Gosstandart USSR; and the Zakarpatskaya Oblast' Board of Directors of the Scientific-Technical Society.

More than 250 representatives of ministries and departments, republics and cities participated in the conference. More than 50 papers and communications on a wide range of problems concerning the economic effectiveness of ASU's [automated management systems] were heard and discussed in the course of the plenary sessions and the work of the two sections. A meeting between the participants in the conference and the developers of ASU's for the enterprises and organizations of the oblast' was arranged at the "Mukachevpribor" Plant.

The conference adopted some concrete recommendations on improving the technical and economic basis of the ASU's being created in the oblast'.

USSR

SECOND ALL-UNION TRAINING COURSE IN MODELING PRODUCTION CONTROL

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1976 pp 140-141

PODCHASOVA, T.P., and TATAROV, V.A.

[Abstract] From 29 May to 10 Jun 76 the Production Control Department of Leningrad Finance and Economics Institute imeni N.A. Voznesenskiy conducted near Tallin the Second All-Union Training Course in Modeling Production Control. More than 50 scientists from Moscow, Leningrad, Kiev, Tallin, Minsk, Vilnius, Kishinev, and other cities in the country participated. The introductory talk was given by Deputy Chairman of the Estonian SSR Council of Ministers, B.E. Saul'. This was followed by a speech by Yu. A. Lavrikov, rector of the institute. Problems posed by different specialists, such as economists, mathematicians, production organizers, and VUZ, research institute,

and industrial enterprise personnel were discussed. Lectures on fundamentals were combined with reports grouped by theme. One lecture stressed the general trend of making natural sciences more mathematical and of extensively introducing modeling in socioeconomic studies. Software making it possible to formalize conflict is necessary for this, specifically game theory. Another lecture was devoted to conceptual problems of the general theory of economic systems. Of great interest were problems in constructing a unified set of models for optimizing control of production materials and equipment provision. It was demonstrated that the main approach to designing models of practical value is to synthesize them from lower-level models describing actual processes of product flow in manufacturing. New methods of forecast planning must be developed to meet the increase in the level of uncertainty in manufacturing systems, described as a natural law conforming with basic trends in the development of modern manufacturing. One of the ways to solve this problem is to use methods of automatic classification based on the theory of model identification and opening the door to formalization of inductive logical progression. A formalized description was given of basic problems in controlling digital-process production, and possible approaches to solving them were offered. Special attention was devoted to questions of coordinating scheduling of all stages in the production process. A description was given of a set of models for step-by-step scheduling and direct regulation of production, combining ideas of calendar scheduling with methods of lumping initial information and sorting out the results obtained. Other reports were devoted to models for forming manufacturing associations and evaluating their efficiency, and to models for optimizing scheduling decisions at the industry or union republic level.

USSR

SECOND INTERNATIONAL CONFERENCE ON PROBLEMS OF AMS [AUTOMATED MANAGEMENT SYSTEMS] FOR ALL TYPES OF TRANSPORTATION. MATERIALS AND DISCUSSION

Prague VTORAYA MEZHDUNARODNAYA KONFERENTSIYA PO VOPROSAM ASU NA VSEKH VIKAKH TRANSPORTA, MATERIALS AND DISCUSSION (Coordination Center of Member Countries of Agreement on Scientific and Technical Cooperation on the Problem of "Utilization of Computer Technology and Mathematical Methods in Transport") in Russian 1975 159 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9G357K by V. A. Garmash]

[Text] This collection contains 7 works. In particular, descriptions are presented of the plan for a functional system for operational control of transportation work, plus trends in the development of the application of computer technology and concepts involved in the combined automation of control systems of railroad transport with interaction with systems of other types of transport. Automated management systems in transport are also discussed.

USSR

INTERNATIONAL SYMPOSIUM ON PROCESS CONTROL SOFTWARE

Moscow PROGRAMMIROVANIYE in Russian No 5, Sep/Oct 76 pp 100-102

TAMM, B. G.

[Abstract] The First International Symposium on Process Control Software (SOCOCO-76) was held 25-28 May in Tallin. Some 250 specialists from 16 countries took part in the symposium. The greatest number of reports read at the symposium was on the subject of industrial process control. Of key significance in effective composition of software and arrangement of hardware for computer control systems are the operational realtime systems. Therefore, a special section was set up for reports on this subject. The continuing problem of development of various programming languages for process control was discussed. One of the most important areas relating to the use of control computers is machine planning. Several reports were heard on this subject. The dialogue form of information processing is increasing in popularity and effectiveness in this area of computer science, and was therefore made the subject of a special section of its own. Both standard and unified as well as specialized software were acknowledged as useful in their own areas.

The symposium was organized by the Committee on Computer Technology and the Technical Committee on Applications of IFAC [International Federation of Automatic Control] and the Technical Committee on Applications of the International Federation for Information Processing. It was conducted by the USSR National Committee on Automatic Control, the Institute of Control Problems of the Academy of Sciences USSR, and the Institute of Cybernetics of the Academy of Sciences Estonian SSR.

USSR

DATA PROCESSING IN THIRD GENERATION COMPUTERS

Moscow OBRABOTKA DANNYKH NA EVM TRET'YEGO POKOLENIYA, MATERIALS OF A SEMINAR ("Znaniye" Society of RSFSR, Moscow Scientific and Technical Propaganda House) in Russian 1976 154 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V733K from the annotation]

[Text] The materials of the seminar analyze problems relating to the application of automated management systems; methods of analysis and planning of data processing systems; collection of statistics; estimation of effectiveness; evaluation of modeling; expansion of operating systems in order to allow for new hardware and operating modes of computer systems; expansion of the spectrum of programming; and applied programming.

USSR

SYMPOSIUM ON ROBOTS AND MANIPULATORS

Moscow ZNANIYE-SILA in Russian ("Robots, Robots, Robots...") No 10, Oct 76
pp 3-4

LEVITIN, K.

[Abstract] The Sixth All-Union Symposium on the theory and application of robots and manipulators was held in May of this year in Tol'yatti. In this article, the Director of the Institute of Machine Science imeni A. A. Blagonravov, Konstantin Vasil'yevich Frolov, discusses the first steps in robot engineering in the USSR. Frolov states that the idea of bio-electric control was developed in his Institute in 1958, and used to create the world' first system of bionic manipulation or "bio-arm." The Institute has been interested in both applied and advanced research for its entire 40 years of existence. It was at this Institute that the basic principles of the theory of the so-called stepping system of digital control of machine tools was developed and the first models made, where studies of important problems of machine theory, machine acoustics, bio-mechanics and the working movements of humans and the protection of workers from vibration were studied; the principles of design of digital adaptive machine control and many other important firsts were developed here. In 1965, the Institute held the world' first symposium on the theory and principles of design of robots and manipulators. Less than 30 participants discussed 12 reports. Now, a Special Scientific Council on Robot Technology headed by I. I. Artobolevskiy has been created, uniting scientists and engineers working in this promising and interesting area of technology. This Council has conducted the last two symposia on the same subject. Following this interview with Frolov, the author describes the assembly line of the Tol'yatti Motor Vehicle Plant and gives an impression of the immense size and efficiency of the plant.

B. Organizations

USSR

INSTITUTE FOR AUTOMATION OF PLANNING AND CONTROL ESTABLISHED IN ALMA-ATA

Moscow EKONOMICHESKAYA GAZETA in Russian ("Improvement of the Structure of Control") No 11, Mar 77 p 8

[Text] A Scientific Research Institute for Automation of Planning and Improvement in the Structure of Control has been established in Alma-Ata. It will become the chief institution for the development of automated systems for control of the national economy of Kazakhstan.

The organization of such an institute was necessitated by the rapid tempo of development of the economy and the widespread introduction of computer technology. There are 170 computer centers and automated control systems operating in the republic at the present time. By the end of the five-year plan the number will have approximately doubled. Computers are helping design powerful electrical transmission lines and major highways, determine the optimal structure of cultivated areas, grow scheduled harvests of grain and cotton, prospect for mineral resources, and model underground deposits of fresh water.

USSR

INSTITUTE OF MATHEMATICS AND CYBERNETICS ESTABLISHED IN LITHUANIA

Vil'nyus SOVETSKAYA LITVA in Russian ("Official Department") 18 Dec 77 p 3

[Excerpt] By decree of the Council of Ministers Lithuanian SSR, the Presidium of the Academy of Sciences has been authorized to divide the Institute of Physics into two independent institutes: the Institute of Mathematics and Cybernetics and the Institute of Physics.

USSR

PHOTO CAPTION

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, Sep/Oct 76
inside front cover.

A dialogue between an operator and the M4030 computer in the Computer Center of the Institute of Cybernetics, Academy of Sciences Ukrainian SSR.



C. Personalities

USSR

V. N. TRET'YAKOV CELEBRATES 70TH BIRTHDAY

Moscow PRIBORY SISTEMY UPRAVLENIYA in Russian ("70 Years to Vasiliy Nikitich Tret'yakov") No 9, 1976 p 17

[Abstract] Vasiliy Nikitich Tret'yakov, a leading Soviet specialist in the field of instrument building, has just celebrated his 70th birthday. Since the beginning of the 1960's he has served as deputy chairman of the State Committee on Ship Building of the Council of Ministers USSR, then as deputy chairman of the State Committee for the Coordination of Scientific Research Work, also under the Council of Ministers USSR. Since 1965 he has been first deputy minister of the Ministry of Instrument Building, Automation Equipment, and Control Systems USSR. For his services to the motherland, Vasiliy Nikitich has been awarded the Orders of Lenin, the October Revolution, Labor Red Banner, and Red Star, as well as the Badge of Honor and various medals.

D. Publications

USSR

ARTIFICIAL INTELLECT AND PSYCHOLOGY

Moscow PRIRODA in Russian No 1, 1977 p 156

[Review of book "Iskusstvennyy Intellekt i Psikhologiya," O. K. Tikhomirov, editor-in-chief, Moscow, "Nauka" Publishing House 1976 344 pp]

[Abstract] The book briefly reviewed here reflects the first stage of work carried out within the framework of the research program "Psychological Problems in the Creation and Use of 'Artificial Intellect,'" organized by the Committee on Systems Analysis under the Presidium of the Academy of Sciences USSR. The authors compare human intellectual activity with the operational principles of computers, concentrating on a theoretical and experimental analysis of specific characteristic features of human intellectual activity, such as motivation, problem formulation and the dynamics of capacity for mental work.

USSR

PROBLEMS OF CREATION OF RAS AND THE STATE NETWORK OF COMPUTER CENTERS

Kiev VOPROSY SOZDANIYA RAS [Republic Automated System] I GORUDARSTVENNOY SETI VYCHISLITEL'NYKH TSENTROV (Academy of Sciences UkSSR, Scientific Council on the Problem "Cybernetics" Institute of Cybernetics) in Russian 1975 124 pp

[From REFERATIVNYY ZHURNAL KIBERNETIKA No 9, 1976 Abstract No 9V809K]

[No abstract]

USSR

ON THE LATVIAN JOURNAL "AUTOMATION AND COMPUTER TECHNOLOGY"

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 9, 1976 pp 20-24

RED'KO, V. A.

[Abstract] According to a resolution of the Latvian Presidium in January, 1967, this journal was begun under the aegis of the Institute of Electronics and Computer Technology (Latvia). Its chief editor is Academician E. A. Yakubaytis. The main themes of the journal are theory of finite automata; reliability and efficiency; methods and means of research for telemetry devices and systems; automation devices and computers. Studies are contributed from Moscow, Leningrad, Kiev, Novosibirsk, Lvov, Kharkov, Tashkent and Bulgaria, Czechoslovakia, Poland, Belgium, Italy and France. About 600 articles were published during the 1971-1975 period. In 1976 there were more than 1100 foreign subscribers (to the Russian edition). It is also translated and published in the USA in English. In 1977, over 7000 copies of each issue will be printed. Important research trends include multifunctional and general-purpose components and synthesis of programmable automata. A new research trend is random quantization of signals for measuring short intervals of time and amplitude.

CSO: 1863

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