Anatoly Shalyto

Professor of Computer Science in St.-Petersburg State University of Information Technologies, Mechancis Optics, Russia.
Head of Programming Technologies Department.
Doctor of technical sciences.

Contacts

St.-Petersburg State University of Information Technologies, Mechanics and Optics. Sablinskaya str., 14, St.-Petersburg, 197101, Russia.

phone: +7 (812) 247-95-45 (work)
phone: +7 (812) 233-0089 (work)

shalyto@mail.ifmo.ru

http://is.ifmo.ru

Employment

Industry carrier

- 1998 – present. Science secretary of "AURORA" Group, St.-Petersburg, Russia.
- 1978 – 1998. Senior Research Scientist in logic design. The Scientific Research Institute in "AURORA" Group, St.-Petersburg, Russia.
- 1973 – 1978. Senior Engineer in logic design. The Scientific Research Institute in "AURORA" Group, St.-Petersburg, Russia.
- 1971 – 1973. Engineer in logic design. The Scientific Research Institute in "AURORA" Group, St.-Petersburg, Russia.

University carrier

- 2004– present. Head of Programming Technologies Department in Saint-Petersburg State University of Information Technologies, Mechanics and Optics, Russia.
- 2000 – 2004. Head of Information Systems Department in St.-Petersburg State University of Information Technologies, Mechanics and Optics, Russia.
- 1998 – 2000. Professor of Computer Technology Department in St.-Petersburg State University of Information Technologies, Mechanics and Optics, Russia.
- 1992 – 1994. Visiting Associate Professor. Polytechnic Institute. St.-Petersburg, Russia.
- 1981 – 1992. Visiting Associate Professor. Coordinator of Research in logic design. Institute for Postgraduate Programs of Ship Building Industry. St.-Petersburg, Russia.
- 1974 – 1981. Visiting Associate Professor. Institute for Postgraduate Programs of Ship Building Industry. St.-Petersburg, Russia.

Education

- 1999. Doctor of Technical Sciences. St.-Petersburg State Electrotechnical University. St. Petersburg, Russia.
- 1974 – 1977. Ph.D. The Scientific Research Institute in "AURORA" Group. St.-Petersburg, Russia. Computer Science of Electrical Engineering.
- 1969 – 1971. M.S. Department of Automatic Control and Computer Science. Leningrad

Electrotechnical Institute. St.-Petersburg, Russia.
- 1965 – 1969. B.S. Department of Automatic Control and Computer Science. Leningrad Electrotechnical Institute. St.-Petersburg, Russia.
- 1963 – 1965. Diploma with Specialization in Mathematics. High School # 30. St.-Petersburg, Russia.

Results

Boolean formulas classification in different bases.
- Evaluation method of integral microcircuits logical efficiency. Logical efficiency factor and its connection to the complexity of the forthcoming realization.
- Combinational circuits synthesis method on the basis of low integration level microcircuits or on the basis of array chips library and the forthcoming realization complexity evaluation.
- New logical correlations and their use.
- Methods of efficient use of bottlenecks, multiplexers, ROMs and programmable logic arrays in Boolean functions realization.
- Method of multifunctional logical modules synthesis with minimized external outputs number.
- More than 30 modules protected by patents have been built. Some of them exceed the world analogues.
- Method of combinational circuits synthesis on the basis of modules with evaluations of the complexity of the forthcoming realization.
- Modules consisting of elements with bilateral conductance have been developed, protected by the 2 patents. No world analogues.
- Method of circuits realization on the basis of the modules consisting of elements with bilateral conductance, which provides minimal redundancy.
- Linear and homogeneous structures have been developed as well as methods of their efficient use (5 patents).
- Being offered are the structures of programmable logical controllers based upon various logical principles, as well as controllers classification.
- Binary programs method for Boolean functions and formulas.
- Calculation, enumeration and optimization of the number of routes in binary programs.
- Verification of binary programs realizing Boolean functions and automata.
- Binary programs structuring.
- Methods of Boolean functions realization by arithmetic polynomials. Direct and reverse discrete Fourier conversion for Boolean functions.
- Methods of Boolean functions realization by linear arithmetic polynomials.
- Methodological developments for program realization with the help of various methods of Boolean functions in the basis of C language (comparing of 60 programs, which realize the function "voting of 2 or more from 3" and 30 programs, which realize the Boolean functions system "one – digit adder").
- Switch-technology, that could be names "Automata programming". This technology is useful for problems of
- logic control;
- state-based procedural programming;
- state-based object-oriented programming;
- computational algorithms.
- Foundation for Open Project Documentation.

Publications

More than 250 publishing (3 book, 16 book publications, 70 patents for USSR, 60 research papers (30 are available in English), technical reports etc.) including:

- Book. Artyukhov V.L., Kopeikin G.A., Shalyto A.A. Multifunctional Modules for Logical Control (Leningrad, Energoesdat, 1981). 168 pp.
- Book. Shalyto A.A. Logical control. Methods of hard-ware and software algorithms implementation. SPb.: Nauka (Science), 2000. 628 pp.
- Book. Shalyto A.A. Switch-technology. Algorithmization and programming of tasks of logical control. SPb.: Nauka (Science), 1998. 780 pp.

- Patent USSR "Multifunctional Logic Module", M.cl.G06F 7/00, № 427336, 1974;

Automata Programming

- Shalyto A.A. Algorithmic Graph Schemes and Transition Graphs: Their Use in Software Realization of Logical Control Algorithms. I. //Automation and Remote Control. 1996. Vol. 57. № 6, p.890-897.
- Shalyto A.A. Algorithmic Graph Schemes and Transition Graphs: Their Use in Software Realization of Logical Control Algorithms. II. //Automation and Remote Control. 1996. Vol. 57. № 7, p.1027- 1045. Information about magazine "Automation and Remote Control" on www.maik.ru, www.wkap.nl.
- Shalyto A.A. Software Automation Design: Algorithmization and Programming of Problems of Logical Control //Journal of Computer and Systems Sciences International. 2000. Vol. 39. № 6, p.899-916. Information about magazine "Journal of Computer and Systems Sciences International" on www.maik.ru.
- Shalyto A.A. Logic Control and "Reactive" Systems: Algorithmization and Programming //Automation and Remote Control. 2001. Vol. 62. № 1, p.1-29. Text on www.maik.ru, www.wkap.nl, is.ifmo.ru.
- Shalyto A.A., Tukkel N.I. SWITCH-Technology: An Automated Approach to Developing Software for Reactive Systems //Programming and Computer Software. 2001. 27(5). Information about magazine "Programming and Computer Software" on www.maik.ru, www.wkap.nl.
- Shalyto A.A., Tukkel N.I. Translating Iterative Algorithms into Automation Ones //Programming and Computer Software. 2002. 28(5).
- Shalyto A. Techology of Automata-Based Programming. 2004. http://is.ifmo.ru; http://www.codeproject.com/gen/design/abp.asp

Foundation for Open Project Documentation

- Shalyto A. New Initiative in Programming. Foundation for Open Project Documentation //Proceedings of East-West Design & Test Workshop (EWDTW-2004), Yalta, Ukraine, 2004, pp.64-69. Version of this article was published in www.linuxsummit.org; http://www.codeproject.com/gen/design/nifopd.asp

Transition Processes

- Kiselev V.V., Shalyto A.A. Study of Transitions in One-Contour Logical Circuits //Journal of Computer and Systems Sciences International. 1999. Vol. 38. № 5.

Linear Binary Graphs

- Kuznetsov B.P., Shalyto A.A. Realization of Boolean Formulas by Linear Binary Graphs. I. Synthesize and Analysis //Journal of Computer and Systems Sciences International. 1994. Vol. 33. № 5.
- Kuznetsov B.P., Shalyto A.A. Realization of Boolean Formulas by Linear Binary Graphs. II. Estimations of Number and Total Length of Paths //Journal of Computer and Systems Sciences International. 1995. Vol. 34. № 3.
- Kuznetsov B.P., Shalyto A.A. Realization of Boolean Formulas by Linear Binary Graphs. III. Optimization of Number and Total Length of Paths //Journal of Computer and Systems Sciences International. 1995. Vol. 34. № 5.

Binary Graphs

- Artyukhov V.L., Kuznetsov B.P., Shalyto A.A. Tunable Binary Procedures and Programs with Loops //Automation and Remote Control 1984. Vol. 45. № 11, p.1481-1488.
- Kuznetsov B.P., Shalyto A.A. Structural Approach to Software Implementation of Boolean Functions //Automatic Control and Computer Sciences. 1985. Vol. 26. № 5, p.80-83. Information about magazine "Automatic Control and Computer Sciences" on www.edi.lv.
- Kuznetsov B.P., Shalyto A.A. System of Transformations of Certain Representations of Boolean Functions //Automation and Remote Control. 1985. Vol. 46. № 11, p.1450-1457.
- Rubinov V.I., Shalyto A.A. Method of Constructing Flowcharts of Simple Binary Programs for Systems of Boolean Functions //Automatic Control and Computer Sciences. 1986. Vol. 27. № 4, p.82-87.
- Sagalovich Yu., Shalyto A.A. Binary Programs and Ther Realization by Asynchronous Automata //Problems of Information Transmission, 1987. № 1, p.74-80. Information about magazine "Problems of Information Transmission" on www.maik.ru, www.wkap.nl.
- Rubinov V.I., Shalyto A.A. Design of Flowcharts of Binary Programs for Systems of Boolean Functions Specified by Truth Tables //Automatic Control and Computer Sciences. 1988. Vol. 29. № 1, p.79-83.
- Kuznetsov B.P., Shalyto A.A. The Method of Independent Fragments for Constraction of Linearized Structured Graf-Charts of Algorithm that Implement Systems of Boolean Formulas //Automation and Remote Control. 1998. Vol. 59. № 9.

Arithmetic Polynomials

- Artyukhov V.L., Kondrat`ev V.N., Shalyto A.A. Generating Boolean Functions Via Arithmetic Polynomials //Automation and Remote Control. 1988. Vol. 49. № 4, p.508-515.
- Kondrat`ev V.N., Shalyto A.A. Realization of Systems of Boolean Functions by Liner Arithmetic Polinomials //Automation and Remote Control. 1993. Vol. 54. № 3, p.472-488.
- Kondrat`ev V.N., Shalyto A.A. Realization of Boolean Functions by One Liner Arithmetic Polinomial with Masking //Automation and Remote Control. 1996. Vol. 57. № 1, p.127-137.
- Kondrat`ev V.N., Shalyto A.A. Implementation of Systems of Boolean Functions by Linear Arithmetic Polinomials with Masking //Automation and Remote Control. 1997. Vol. 58. № 3.

Multifunctional Logical Modules

- Artyukhov V.L., Kopeikin G.A., Shalyto A.A. Estimation of the Logical Efficiency of Integrated Microcircuitry //Automatic Control and Computer Sciences. 1981. Vol. 22. № 1, p.32-34.
- Artyukhov V.L., Kopeikin G.A., Shalyto A.A. Bounds on the Realization Complexity of Boolean Formulas by Tree Circuits of Tunable Modules //Automation and Remote Control.

1982. Vol. 42. № 11, p.1532-1537.

- Shalyto A.A. Modules with Paraphrase the Input Variables That Are Universal in Class of All Boolean Functions //Journal of Computer and Systems Sciences International. 1997. Vol. 36. № 5, p.794-801.
- Shalyto A.A. Modules which Are Universal in the Class of Self-Dual Functions and in Close Classes //Journal of Computer and Systems Sciences International. 2001. Vol. 40. № 5, p.782-792.
- Artyukhov V.L., Shalyto A.A. Realization of Boolean Formulas by Uniform Multiplexor and Majority Cascades //Journal of Computer and Systems Sciences International. 1996. Vol. 35. № 5, p.805-815.
- Shalyto A.A. Realization of Boolean Formulas and Boolean Functions by Homogeneous Structures //Journal of Computer and Systems Sciences International. 2002. Vol. 41. № 2, p.264-273.
- Artyukhov V.L., Shalyto A.A., Kuznetsova O.S. Evaluation of the Functional Capabilities of Programmable Logical Arrays //Automatic Control and Computer Sciences. 1985. Vol. 26. № 2, p.69-73.
- Shalyto A.A. Multiplexor Method for Realization of Boolean Functions by Circuits Composed of Arbitrary Logical Elements //Journal of Computer and Systems Sciences International. 2003. Vol. 42. № 1, p.101-105.
- Shalyto A.A. Decomposition of Boolean Functions with Respect to the Right-Most Input Variables of Truth Tables //Journal of Computer and Systems Sciences International. 2003. Vol. 42. № 4, p.555-561.
- Shalyto A.A. Methods for Constructing Multifunctional Logic Modules //Journal of Computer and Systems Sciences International. 2004. Vol. 43. № 6, p.923-935.

Newest Conferences

- Shalyto A. Cognitive Properties of Hierarchical Representations of Complex Logical Structures // Proceedings of the 1995 ISIC Workshop. Monterey, California. 1995, p. 391
- Naumov L., Shalyto A. Automata Theory for Multi-Agent Systems Implementation // Proceedings of International Conference Integration of Knowledge Intensive Multi-Agent Systems: Modeling, Exploration and Engineering. KIMAS `03. Boston. 2003. p. 65-71.
- Shalyto A., Naumov L. Foundation for Open Project Documentation // http://www.linuxsummit.org. 2004.
- Yartsev B., Korneev G., Shalyto A., Kotov V. Automata-Based Programming of the Reactive Multi-Agent Control Systems /International Conference Integration of Knowledge Intensive Multi-Agent Systems: Modeling, Exploration and Engineering. KIMAS `05. Boston. 2005. http://www.ieeeboston.org/kimas05/kimas05_program.htm
- Shalyto A., Naumov L., Korneev G. Methods of Object-Oriented Reactive Agents Implementation on the Basis of Finite Automata. /International Conference Integration of Knowledge Intensive Multi-Agent Systems: Modeling, Exploration and Engineering. KIMAS `05Boston. 2005. http://www.ieeeboston.org/kimas05/kimas05_program.htm

- Chair of session “Theoretical Aspects of Multi-Agent Systems” on International Conference Integration of Knowledge Intensive Multi-Agent Systems: Modeling, Exploration and Engineering. KIMAS `03.
- Chair of session “Theoretical Aspects of Multi-Agent Systems” on International Conference Integration of Knowledge Intensive Multi-Agent Systems: Modeling, Exploration and Engineering. KIMAS `05. http://www.ieeeboston.org/kimas05/kimas05_program.htm

Awards

- The winner of the contest of research projects in sphere of integral scheme design automation, that was organized by *Intel Corporation* in Commonwealth of Independent States in 2003.

Reference

- Boston University. Department of Electrical, Computer and Systems Engineering. 44 Cummington Street. Boston, Massachusetts 02215. Mark Karpovsky. Professor. Director Research Laboratory for Design and Testing of Computer and Communications Systems. 617/ 353 - 9292 (office), 617/ 969 -2553 (home), MR@buenga.bu.edu.
- Drexel University. Department of Electrical and Computer Engineering. Philadelphia. Alex Meystel. Professor. meystel@ece.drexel.edu.