

Summary of researches being performed in the  
Institute of Mathematics and Computer Science  
on computer science and information  
technologies

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Evolution of the informatization notion (which assumes automation of majority of human activities applying computers, computer networks, information technologies) towards the notion of *Global Information Society* (GIS) challenges the determination of new paradigms of society: automation and intellectualization of production, new level of education and teaching, formation of new styles of work, active participation in decision making, etc.

To assure transition to GIS for any society, including that from Republic of Moldova, requires both special training and broad application of progressive technologies and information systems. Methodological aspects concerning impact of GIS creation over the citizen, economic unit, national economy in the aggregate demands a profound study. Without systematic approach to these aspects the GIS creation would have confront great difficulties.

Collective of researchers from the Institute of Mathematics and Computer Science (IMCS) of Academy of Sciences of Moldova, which work in the field of computer science, constitutes the center of advanced researches and activates in those directions of researches of computer science which facilitate technologies and applications without of which the development of GIS cannot be assured. The works of the collective

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deal with methodological aspects of GIS development. The advanced technologies and systems which serve as scientific support for transition to GIS for such domains as health protection, education, economy, research, ecology etc are elaborated and developed in these works. Let us enumerate the domains of interest: actual problems of information society development, information decision support systems, theoretical bases of information systems, formal calculation models, information systems in computational algebra, and information systems in computational linguistics.

The problems of GIS creation are constantly in the view of European Council, one of the last recommendations of which is „i2010 eGovernment Action Plan - Accelerating eGovernment in Europe for the Benefit of All – (25/04/2006)”. In this document there is an attempt to synchronize the efforts of European countries in electronic government, education, and keeping and protection of multi-linguism.

The access to cultural patrimony of the own country and of other countries in his native language is to be guaranteed for each citizen from every European country so as he would be able to understand and appreciate the value and immensity of this patrimony as an integrant of European patrimony. Each country has its own specifics, which compels search of proper ways of transition to GIS on the assumption of its own economic, cultural potential, nation’s traditions etc.

Different aspects of these problems were examined in the works [13, 71, 100, 102, 103, 109, 129].

The book “Considerations on information society development in Moldova” [12] was the first work in Moldova in which a complex approach to the problem **in** and **for** this country is presented. The conceptual bases, principles, policies and main directions in GIS creation were elucidated in it including electronic education, science and culture.

In other works there were examined the problems of evaluation of degree of integration into GIS, proposing a set of integration indices which highlight the specifics of our country. Internet in rural environment and digital divide overcoming constitute the subjects of another works [122, 130, 146].

A group of researchers on computer science from IMCS was invited to take part in writing the collective monograph “*Information technologies communication and human development: Opportunities and challenges*”, published by Idea Group Inc.(USA), in which two chapters of these researchers are included: one is devoted to the general problems of digital inequality and another – the same problem for Moldova [8,9]. These chapters have been selected for inclusion in exclusive, authoritative reference publication „Information Communication Technologies: Concepts, Methodologies, Tools and Applications” published by IGI Global (formerly ”Idea Group Inc.”) in 2008. This six-volume set includes the most dependable, exhaustive research on the subject.

Some proposals based on research results of this group were included into National Strategy of information society construction „Electronic Moldova” and Actions Plan adopted by Government (Decree N 255 from 9.03.2005).

When elaborating applicable information systems the experience of the researchers from IMCS accumulated in the framework of design and automation of programming systems construction had favorable impact [11,72,76,78,82,88,98,121]. The elaborated and utilized methods when developing programming systems (formal grammars, automata, compiling mechanism, text editors) were subsequently used successfully for elaboration of interfaces and tools for database management, linguistic applications.

In the knowledge based society it is just *decision support systems* (DSS) that become very useful and claimed information tools for the factors of decision making of any level [89, 117]. In the monograph [12] “Decision taking. Methods and technologies” there are explicated new approaches to the process of decision making based on information technologies.

Some works [21, 93, 96] are devoted to the researches and elaborations of some DSS used for vehicle transport. The actual problem for any society, including that to which we are aspiring, is distribution of some always limited funds to the set of activities and projects so as to achieve maximal efficiency. The works [75, 110] are dedicated to the elaboration of DSS for optimal funds allotment.

Medical assistance being one of the first application subjects of DSS henceforth represents a perspective area for such applications. About 9% of European Union gross domestic product (GDP) is apportioned for population health support. Raising of the level of diagnostics and adequate medical treatment is the goal of the DSS at ultrasound investigations [62, 108, 132, 148, 149, 158] made by the researchers from IMCS. The goal of this system is to help medic-echographist in the process of ultrasonographic investigations, in obtained images interpretation, in obtaining conclusions adequate to the patient's state of the health and finally to prescribe an adequate treatment.

In the process of investigation of systems or complex phenomena it is necessary for correct decisions making to base on the knowledge of systems behavior under their interaction with certain external factors. Frequently the experiments accomplishment with real systems involving is impossible, because the real system does not exist yet; exists but is not accessible for real experiments; the experiments with real system are expensive or dangerous. In such situations the simulation model which is exposed to experiments is being created. This permits to economize resources, avoid unreasoned expenses, reduce designing periods, minimize risks and to avoid possible catastrophic situations.

The works [76, 87, 90, 111, 114] present the research results which led to the elaboration of *integrated environment for simulation*, which includes possibilities to visualize and analyze experiments results. In articles [91, 113, 126] the experience of simulation application to solution of some concrete problems and to create demonstrative models with training purpose is explicated.

Presence of convenient facilities for experiments results analysis in the case of mathematical models application is as important as in the case of simulation. This permits to find regularities in the behavior of investigated system and to interpret correctly the experiment results.

The solution of ecological problems continues to remain an extremely actual subject for Republic of Moldova. At the same time just in this domain the possibilities offered by information technologies had not been turned to advantages in full measure yet. An approach in this direction is made in the works [128, 131, 150, 151], which explicate

the results of environment creation for analysis of experiments results for mathematical model of physical and biochemical processes of solid waste decomposition.

Such approach was applied when elaborating information-analytical system “Scientific Potential of Moldova” [127], endowed with possibilities to administrate and analyze information about researchers and scientific centers of the country.

One of the top-priority requirements of social development at the stage of transition to GIS is the unhampered access to modern information technologies. To provide all members of community with adequate access to Internet resources, to technologies of information search and extraction, speech perception, text insonification, automatic translation etc, it is necessary the development of national linguistic engineering, which gives technological resources for natural language processing and provides with full-fledged access to Internet. Lack of such technologies at national level hampers our country to join global information resources.

The human-computer communication in *natural language* is a large-scale problem for which it is recognized that still during a long time we will be able only to approach to its solving. The contribution of the collective of IMCS to the development of the technology for natural language processing is the essential segment. The results in this direction can be classified into three domains.

*Linguistic tools.* There were developed encoders and converters for text and graphical information, programs for automatic word inflection, programs for word division into syllables, facilities for linguistic resources administration, electronic multifunctional dictionaries creation, for correctness and completeness of linguistic resources check-up, and also visualization means, interfaces and support for elaboration of adaptable computer-aided learning courses [44, 83, 84, 86, 101, 106, 112, 119, 120, 144, 145].

*Linguistic resources.* There were created reusable linguistic resources (<http://imi201.math.md/elrr>) for natural language, which include annotated corpus for all parts of speech and kernel, containing

circa 70000 basic words-lemmas (entries), accompanied by syntactical and morphological information. This kernel generates computer lexicon, gives the list of all word inflexions for basic word, executes translations into English and Russian languages, posts list of synonyms. General number of word inflexions generated on the basis of lexicon constitutes circa 700 thousands of words [58, 68, 107, 115, 116, 124,154].

*Linguistic applications.* The spelling checker RomSP was elaborated and integrated into text editor MS Word. It allows finding and correcting erroneous words, to give prompting list, gives the possibility to supplement own word base using the tools for automatic word inflection. In collaboration with editorial group LITERA the compact disk with spelling checker RomSP with linguistic base of about 1 000 000 words had been published.

Also on the bases of developed linguistic resources there were created electronic dictionaries of synonyms, Romanian-English and Romanian-Russian translations, and adaptable system of computer-aided learning course [45, 74, 81, 155, 157].

Elaboration of computation lexicon, accumulation of linguistic resources in electronic format allows making a forward step in natural language application to realization of interfaces for information systems for the purpose of assuring of friendly mode of work for the user [10,80].

Information technologies became tools that influence and propel researches in other domains of science. A set of works [1, 4, 7, 16, 38, 47, 79, 85, 99, 104, 123, 147] presents the results of researches in *development of a symbolic computation system*.

Researches of the group of authors from IMCS had been centered towards two directions: extension of calculating capacity of SCS and creation of intelligent interfaces. There were developed architectural principles of intelligent interfaces construction for SCS, the application of which facilitates “human-computer” interaction, permits extension of the circle of users. Such interfaces possess capacities to adapt to users’ needs, to train; they are able to take the initiative in communication with the user (doing this in natural language or in a subset of that) guiding him with the purpose to facilitate

reaching his objectives in a way as rapid and comfortable as possible. Some of these principles were applied during implementation of the Computer Algebra System Bergman interface (elaborated by Jörgen Backelin, Stockholm University, and improved in collaboration with IMCS)(<http://www.math.su.se/bergman>) assuring overtaking the problem from user, its adaptation to the user's preferences (executed in three modes: a priori, on user's initiative and on system's initiative), errors prevention, creating of calculation environment – by all of this in ultimate authority contributing to create for any user apart his personal entourage oriented to the class of problems which constitute his occupations.

The explosion of demand for information technologies faces exhaustion of capabilities of conventional computers. This is why research started in the last years to find possibilities to increase computer performance using new, non-conventional approaches. Starting in 1994 the domain of *biocomputing* appeared, in which the contribution of researchers from IMCS was carried out in two directions: research of the formal computational models and creating algorithms of solving computationally difficult problems applying models of biocomputing.

Research in theoretical foundations of informational systems and formal computational models is done in two directions: computing devices built according to mechanical/linguistic principles (automata and grammars, Turing machines, register machines, insertion-deletion systems) and devices constructed according to biological principles (cellular automata, membrane systems, networks of evolutionary processors). Both directions contribute to theoretical bases of creation of informational systems of either special or general use with special requirements on the computing speed, robustness and size. Natural (biological) computing follows big ambitions: constructing computing devices from biological components (molecules, DNA, neurons, cells, etc.). Laboratory experiments showed that prototypes of such biodevices can solve many problems faster and more efficiently than traditional devices, due to the massive parallelism. Biocomputing has numerous applications: treating cancer; creating „smart drugs“; creating nano-robots to locate unhealthy organs; prediction etc.). Research of these computing

principles is very relevant in present; it can be compared to the great importance of research of such scientists as Goedel, Kleene, Turing, Post and von Neumann, that led to the creation of modern computers.

In the first direction: the results obtained by the researchers from IMCS in the area of minimal universal Turing machines were included in multiple monographs and manuals. Works [17, 19, 46, 48, 50, 51, 73, 77, 92, 95, 97] are devoted to this topic. Computational models equivalent to the Turing machines are type-0 Chomsky grammars and insertion-deletion systems. The results obtained during research of the latter ones are presented in works [43, 57, 59].

Within the second direction, various natural computational models were studied, such as H systems, membrane systems, and networks of evolutionary processors.

Membrane systems, also called P systems, represent a number of regions, separated by membranes. Each region contains objects in some multiplicities. These objects evolve according to certain rules associated to regions and/or membranes. Depending on the computational model, the rules can be of evolution (replacing objects with other ones), communicative (objects move from a region across a membrane into another region), etc. Works of the researchers from IMCS, which concern this domain, can be divided in 7 groups.

*Computational power of evolution-communication P systems*, the works [6, 23, 33, 53, 54, 136]. Systems with non-cooperative evolution rules and communication rules acting on at most two objects were studied. For such systems, two membranes are sufficient for the computational completeness, and three membranes are sufficient in the deterministic case. Other particular cases were also thoroughly studied.

*Computational power of communicative P systems*, the works [29, 31, 34, 36, 37, 42, 65, 70, 105, 135, 137, 138, 140, 141, 142]. As opposed to the previous group, the evolution rules are replaced with unbounded supply of objects in the external region (environment). Practically all results obtained by other authors on this topic were improved. In case of communicative rules with at most two objects and one membrane only finite sets can be generated. Three membranes are sufficient for the



computational completeness, while two membranes are enough modulo one additional object.

*Efficiency of P systems with active membranes*, the works [5, 28, 41, 52, 55, 56, 61, 69, 153]. This computational model with active membranes is convenient for describing solutions of NP-complete and even PSPACE-complete problems. Cases with two polarizations and without polarizations were thoroughly studied.

*Computational power of P systems with active membranes*, the works [6, 30, 63, 66, 139]. The computational completeness of systems with one membrane and two polarizations, and for systems without polarizations was proved.

*Other variants of P systems*, the works [6, 24, 25, 32, 35, 39, 40, 57, 63, 64, 66, 133, 134, 139, 143, 152, 156]. The following P-systems were investigated: non-distributed; neural; with partial halting; with rules with target indications; systems with energy assigned to membranes; with rules of object diffusion; with bi-stable catalysts, promoters, inhibitors; models with strings.

*H systems – abstraction of splicing reactions (performed in biology by restriction enzymes DNA lygase)*, the works [2, 3, 18, 20, 22, 26, 49, 57, 60, 118]. The results of other authors were improved, obtaining a series of unexpected results. It was proved that time-varied H systems of degree I are computationally complete devices.

*Other biocomputing models*, the works [27, 67]. Computing by observing, self-assembly, networks of evolutionary processors.

A possibility of efficient use of molecular computing in non-commutative computational systems is argued in [94]. An algorithm of deciding finiteness of algebra dimension is proposed based on molecular operations [125].

„Life as computation” paradigm was introduced in hope that experience in computer science and mathematics obtained in result of research in parallel systems will help us to understand the complexity of the processes taking place in living cells, contributing to discovery of regularities of biological systems that are otherwise difficult or even

impossible to observe. The goal of this research is to understand the way of functioning of cells or organisms, conditions of adaptation and survival in dynamic environment, all explained in terms of computations.

## References

- [1] S. Cojocaru, A.Podoplelov, V. Ufnarovski. Non-Commutative Groebner Bases and Anick's resolution. In: Progress in Mathematics, vol.173, Chapter 7, Birkhäuser Verlag, 1999, p.139-159.
- [2] M. Margenstern, Yu. Rogozhin. Time-varying distributed H systems of degree 1 generate all recursively enumerable languages. In: „Words, Semigroups, and Transductions. Festschrift in Honor of Gabriel Thierrin” (M. Ito, Gh. Păun, Sh. Yu, Eds.), World Scientific, 2001, pp.329-340.
- [3] M. Margenstern, Yu. Rogozhin. Time-varying distributed H systems of degree 2 generate all recursively enumerable languages. In: “Where Mathematics, Computer Science, Linguistics and Biology Meet”, Chapter 35, Kluwer Academic publishers, 2001, pp. 399-407.
- [4] J.Backelin, S.Cojocaru, V.Ufnarovski. BERGMAN. In: “Computer Algebra Handbook” . J.Grabmeier, E.Kaltofen, V.Weispfenning (Eds.). Springer, 2003, pp. 349-352.
- [5] A. Alhazov, C. Martín-Vide, L. Pan. Solving Graph Problems by P Systems with Restricted Elementary Active Membranes. In: N. Jonoska, Gh. Păun, G. Rozenberg: Aspects of Molecular Computing - Essays dedicated to Tom Head on the occasion of his 70th birthday, Lecture Notes in Computer Science, vol. 2950, Festschrift, Springer, 2004, pp. 1-22.
- [6] A. Alhazov, D. Sburlan. Static Sorting P Systems. In: G. Ciobanu, Gh. Păun, M.J. Pérez-Jiménez: “Applications of Membrane Computing, Natural Computing Series”, Springer-Verlag, Berlin, 2005, pp. 215-252.
- [7] J. Backelin, S. Cojocaru, V Ufnarovski. Mathematical computations using Bergman. Lund University, Sweden, 2005, ISBN 91-631-7203-8, 206 p.
- [8] L. Burţeva, S. Cojocaru, C. Gaiandric, G. Magariu, T. Verlan. Digital divide: A glance at the problem in Moldova. In: „Information technologies communication and human development:Opportunities and challenges”, Idea Group Inc., Hershey, London, Melbourne, Singapore, 2006, pp. 77-115.  
  
The chapter is republished in: Information Communication Technologies: Concepts, Methodologies, Tools, and Applications (6 Volumes). Edited by Craig Van Slyke, University of Central Florida, IGI Global, USA, 2008, Chapter 5.21, pp. 2531-2565.
- [9] L. Burţeva, S. Cojocaru, C. Gaiandric, G. Magariu, T. Verlan. Digital divide: Introduction to the problem. In: „Information technologies communication and human

development:Opportunities and challenges”, Idea Group Inc., Hershey, London, Melbourne, Singapore, 2006, pp. 57-76.

The chapter is republished in: Information Communication Technologies: Concepts, Methodologies, Tools, and Applications (6 Volumes). Edited by Craig Van Slyke, University of Central Florida, IGI Global, USA, 2008, Chapter 1.6, pp.74-90.

- [10] S. Cojocaru. Interfețe inteligente. Subcapitolul 4.4.4.3 în monografia F.G. Filip „Sisteme suport pentru decizii”, Editura tehnică, București, 2007, pp. 213-215.
- [11] M.V.Evstiunin, S.K.Cojocaru, A.N.Terehov, B.A.Ufnarovski. How Pascal and Oberon fall into Samson or the art of compilers construction. Chișinău, ”Știința”, 1991, 304 p. (in Russian)
- [12] C. Găindric. Luarea deciziilor. Metode și tehnologii, Chișinău, ”Știința”. 1998, 162 p.
- [13] S. Cojocaru, C. Găindric. Considerente asupra edificării societății informaționale în Moldova, Chișinău, Institutul de Matematică și Informatică, 2003, 95 p.
- [14] Machines, Computations and Universality. M. Margenstern, Yu. Rogozhin (Editors). Lecture Notes in Computer Science, Springer, vol. 2055, Third International Conference, MCU 2001 Chișinău, Moldavia, May 23-27, 2001, Proceedings, 320 p.
- [15] Symposium on Intelligent Systems and applications. H.N.Teodorescu, C. Găindric, E. Sofron (Editors), România, september 19-20, 2003, CD ISBN 973-97737-2-9.
- [16] Computational Commutative and Non-Commutative Algebraic Geometry. S. Cojocaru, G. Pfister, V. Ufnarovski (Editors). NATO Science Series. SeriesIII: Computer and Systems Sciences – Vol.196, IOS Press, 2005, 325 p. Cartea este însoțită de un CD cu sisteme de algebră computațională, care conține și sistemul BERGMAN, elaborat cu contribuția autorului.
- [17] M. Kudlek, Yu. Rogozhin. New small universal circular Post machines. Lecture Notes in Computer Science, vol. 2138, Springer, 2001, pp. 217-227.
- [18] M. Margenstern, Yu. Rogozhin. About time-varying distributed H systems. Lecture Notes in Computer Science, vol. 2054, Springer, 2001, pp. 53-62.
- [19] M. Kudlek, Yu. Rogozhin. A Universal Turing Machine with 3 States and 9 symbols. Lecture Notes in Computer Science, vol. 2295, Springer, 2002, pp. 311-318.
- [20] M. Margenstern, Yu. Rogozhin. A universal time-varying distributed H system of degree 1. Lecture Notes in Computer Science, vol. 2340, Springer, 2002, 371-380.
- [21] C. Găindric. Fuzzy evaluation Processing in Decision Support Systems, in Systematic Organization of Information in Fuzzy Systems, NATO Science Series III Computer and Systems Sciences, v.184, IOS Press, Amsterdam, Berlin, Oxford, Tokyo, Washington DC, 2003, pp. 355-358.
- [22] M.Margenstern, Yu. Rogozhin, S. Verlan. Time-Varying Distributed H Systems of Degree 2 Can Carry Out Parallel Computations. Lecture Notes in Computer Science, vol. 2568, Springer, 2003, pp. 326-336.

- [23] A. Alhazov, M. Cavaliere: Proton Pumping P Systems. In: C. Martín-Vide, G. Mauri, Gh. Păun, G. Rozenberg, A. Salomaa. Membrane Computing, International Workshop, WMC 2003, Tarragona, 2003, Revised Papers, Lecture Notes in Computer Science, vol. 2933, Springer, 2004, pp. 1-18.
- [24] V. Rogozhin, E. Boian. Simulation of mobile ambients by P systems. Part 1. Lecture Notes in Computer Science, vol. 2933, Springer, Berlin, 2004, pp. 304–319.
- [25] F. Freund, R. Freund, M. Oswald, M. Margenstern, Yu. Rogozhin, S. Verlan. P Systems with Cutting/Recombination Rules Assigned to Membranes. Lecture Notes in Computer Science, vol. 2933, Springer, 2004, pp. 191-202.
- [26] M. Margenstern, Yu. Rogozhin, S. Verlan. Time-varying distributed H systems with parallel computations: the problem is solved. Lecture Notes in Computer Science, vol. 2943, Springer, 2004, pp. 48-53.
- [27] A. Alhazov, M. Cavaliere: Computing by Observing Bio-Systems: the Case of Sticker Systems. In: C. Ferretti, G. Mauri, C. Zandron: DNA Computing: 10th International Workshop on DNA Computing, DNA10, Milan, Italy, June 7-10, 2004, Revised Selected Papers, Lecture Notes in Computer Science, vol. 3384, Springer, 2005, pp. 1-13.
- [28] A. Alhazov, R. Freund. On the Efficiency of P Systems with Active Membranes and Two Polarizations. In: G. Mauri, Gh. Păun, M.J. Pérez-Jiménez, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2004, Milan, 2004, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 3365, Springer, 2005, pp. 146-160.
- [29] A. Alhazov, R. Freund, M. Oswald: Tissue P Systems with Antiport Rules and Small Numbers of Symbols and Cells. In: C. De Felice, A. Restivo: Developments in Language Theory: 9th International Conference, DLT 2005, Palermo, Italy, 2005, Proceedings, Lecture Notes in Computer Science, vol. 3572, Springer, 2005, pp. 100-111.
- [30] A. Alhazov, R. Freund, Gh. Păun. Computational Completeness of P Systems with Active Membranes and Two Polarizations. In: M. Margenstern: Machines, Computations, and Universality, International Conference, MCU 2004, Saint Petersburg, 2004, Revised Selected Papers, Lecture Notes in Computer Science, vol. 3354, Springer, 2005, pp. 82-92.
- [31] A. Alhazov, M. Margenstern, V. Rogozhin, Yu. Rogozhin, S. Verlan. Communicative P Systems with Minimal Cooperation. In: G. Mauri, Gh. Păun, M.J. Pérez-Jiménez, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2004, Milan, 2004, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 3365, Springer, 2005, pp. 161 - 177.
- [32] A. Alhazov, D. Sburlan. Ultimately Confluent Rewriting Systems. Parallel Multiset-Rewriting with Permitting or Forbidding Contexts. In: G. Mauri, Gh. Păun, M.J. Pérez-Jiménez, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2004, Milan, 2004, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 3365, Springer, 2005, pp. 178-189.

- [33] A. Alhazov. Number of Protons/Bi-stable Catalysts and Membranes in P Systems. Time-Freeness. In: R. Freund, Gh. Păun, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2005, Vienna, 2005, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 3850, Springer, 2006, pp. 79-95.
- [34] A. Alhazov, R. Freund, M. Oswald. Symbol / Membrane Complexity of P Systems with Symport / Antiport Rules. In: R. Freund, Gh. Păun, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2005, Vienna, 2005, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 3850, Springer, 2006, pp. 96-113.
- [35] A. Alhazov, R. Freund, M. Oswald, M. Slavkovik. Extended Spiking Neural P Systems. In: H.J. Hoogeboom, Gh. Păun, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2006, Leiden, The Netherlands, 2006, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 4361, Springer, 2006, pp. 123-134.
- [36] A. Alhazov, R. Freund, Yu. Rogozhin. Computational Power of Symport/Antiport: History, Advances, and Open Problems. In: R. Freund, Gh. Păun, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2005, Vienna, 2005, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 3850, Springer, 2006, pp. 1-30.
- [37] A. Alhazov, Yu. Rogozhin. Towards a Characterization of P Systems with Minimal Symport/Antiport and Two membranes. In: H.J. Hoogeboom, Gh. Păun, G. Rozenberg, A. Salomaa: Membrane Computing, International Workshop, WMC 2006, Leiden, The Netherlands, 2006, Revised Selected and Invited Papers, Lecture Notes in Computer Science, vol. 4361, Springer, 2006, pp. 135 - 153.
- [38] S. Cojocaru, A. Colesnicov, L. Malahov. Providing Modern Software Environments to Computer Algebra Systems. Computer Algebra in Scientific Computing. Lecture Notes in Computer Science, vol. 4194, Springer, 2006, pp. 129-140.
- [39] Yu. Rogozhin, S. Verlan. On the Rule Complexity of Universal Tissue P Systems. Lecture Notes in Computer Science, vol. 3850, Springer, 2006, pp. 356-362.
- [40] A. Alhazov, R. Freund, M. Oswald, S. Verlan. Partial Halting in P Systems Using Membrane Rules with Permitting Contexts. In: J. Durand-Lose, M. Margenstern (Eds.), Machines, Computations, and Universality, 5th International Conference, MCU 2007, Orléans, Lecture Notes in Computer Science, vol. 4664, Springer, 2007, pp. 110-121.
- [41] A. Alhazov, M.J. Pérez-Jiménez. Uniform Solution of QSAT Using Polarizationless Active Membranes. In: J. Durand-Lose, M. Margenstern (Eds.), Machines, Computations, and Universality, 5th International Conference, MCU 2007, Orléans, Lecture Notes in Computer Science, vol. 4664, Springer, 2007, pp. 122-133.
- [42] A. Alhazov, Yu. Rogozhin. Skin Output in P Systems with Minimal Symport/Antiport and Two Membranes. In: G. Eleftherakis, P. Kefalas, Gh. Păun, G. Rozenberg, A. Salomaa (Eds.), Membrane Computing, 8th International Workshop, WMC 2007 Thessaloniki, 2007, Revised Selected and Invited Papers. Lecture Notes in Computer Science, vol. 4860, Springer, 2007, pp. 97-112.

## Summary of researches being performed in . . .

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- [43] A. Matveevici, Yu. Rogozhin, S. Verlan. Insertion-Deletion Systems with One-Sided Contexts. *Lecture Notes in Computer Science*, vol. 4664, Springer, 2007, pp. 205-217.
- [44] E. Boian, A. Danilchenko, L. Topal. Automation of Word-forming Process in the Romanian Language. *Studies in Informatics and Control*, vol.3, no.1, March, 1994, pp. 43 - 52.
- [45] S. Cojocaru, M. Evstiunin, V. Ufnarovski. Romanian Spelling Checker. *Studies in Informatics and Control*, vol.3, no.1, 1994, Bucharest, pp. 53-58.
- [46] Yu. Rogozhin. *Small Universal Turing Machines*. Theoretical Computer Science, 168-2, Elsevier, 1996, pp. 215-240.
- [47] S. Cojocaru, V. Ufnarovski. BERGMAN under MS DOS and Anick's resolution. *Discrete Mathematics and Theoretical Computer Science*, vol.1, Special Issue: Lie Computations, 1997, pp. 139-147.
- [48] Yu. Rogozhin. A universal Turing machine with 22 states and 2 symbols. *Romanian Journal of Information Science and Technology*, vol. 1, no.3, Romanian Academy, 1998, 259-265.
- [49] M. Margenstern, Yu. Rogozhin. A universal time-varying distributed H-system of degree 2. *Biosystems*, 52, Elsevier, 1999, pp. 73-80.
- [50] M. Kudlek, Yu. Rogozhin. Small universal Turing and circular Post machines. *P.U.M.A. Pure Mathematics and Applications*, Budapest University of Economics, University of Siena, HU ISSN 1218-4586, 13, no.1-2, 2002, pp. 197-210.
- [51] M. Margenstern, Yu. Rogozhin. Self-describing Turing machines. *Fundamenta Informaticae*, 50, no.3-4, IOS Press, 2002, pp. 285-303.
- [52] A. Alhazov, C. Martín-Vide, L. Pan. Solving a PSPACE-Complete Problem by P Systems with Restricted Active Membranes. *Fundamenta Informaticae*, volume 58, number 2, IOS Press, 2003, pp. 67-77.
- [53] A. Alhazov. Minimizing Evolution-Communication P Systems and Automata. *New Generation Computing*, volume 22, number 4, Ohmsha Ltd., Springer, 2004, pp. 299-310.
- [54] A. Alhazov. On Determinism of Evolution-Communication P Systems. *Journal of Universal Computer Science*, volume 10, number 5, Graz University of Technology, 2004, pp. 502-508.
- [55] A. Alhazov, L. Pan. Polarizationless P Systems with Active Membranes. *Grammars*, volume 7, 2004, pp. 141-159.
- [56] A. Alhazov, L. Pan, Gh. Păun. Trading Polarizations for Labels in P Systems with Active Membranes. *Acta Informatica*, volume 41, numbers 2-3, Springer, 2004, pp. 111-144.

- [57] M. Margenstern, G.h. Păun, Yu. Rogozhin. On the power of the (molecular) crowd: set-conditional string processing. *Publicationes Mathematicae*, Debrecen (Hungary), vol.65, 2004, pp. 575 – 590.
- [58] E. Boian, C.Ciubotaru, S. Cojocaru, A. Colesnicov, V. Demidova, L. Malahov. Lexical Resources for Romanian. *Academia Română. Memoriile secțiilor științifice. Seria IV*, tomul XXVI, 2003, Editura Academiei Române, București, 2005, pp. 267-278.
- [59] M. Margenstern, Gh. Păun, Yu. Rogozhin, S. Verlan. Context-free insertion-deletion systems. *Theoretical Computer Science*, vol.330, issue 2, Elsevier, 2005, pp. 339-348.
- [60] M. Margenstern, S. Verlan, Yu. Rogozhin. Time-Varying Distributed H Systems: An Overview. *Fundamenta Informaticae*, vol. 64, IOS Press, 2005, pp. 291-306.
- [61] L. Pan, A. Alhazov, T.-O. Ishdorj. Further Remarks on P Systems with Active Membranes, Separation, Merging, and Release Rules. *Soft Computing. A Fusion of Foundations, Methodologies and Applications*, volume 9, number 9, Springer, 2005, pp. 686-690.
- [62] E. Ribac, S. Cojocaru, C. Gaidric, S.Puiu, V.Turcanu. The user interface design for a decision support system in sonographic investigation, *Revista de inventica*, N48, v.I AN V-2005 pp. 7-12.
- [63] A. Alhazov. P Systems without Multiplicities of Symbol-Objects. *Information Processing Letters*, volume 100, number 3, Elsevier, 2006, pp. 124-129.
- [64] A. Alhazov, R. Freund, A. Leporati, M. Oswald, C. Zandron. (Tissue) P Systems with Unit Rules and Energy Assigned to Membranes. *Fundamenta Informaticae*, volume 74, number 4, IOS Press, 2006, pp. 391-408.
- [65] A. Alhazov, R. Freund, M. Oswald. Cell / Symbol Complexity of Tissue P Systems with Symport / Antiport Rules. *International Journal of Foundations of Computer Science*, volume 17, number 1, World Scientific, 2006, pp. 3-26.
- [66] A. Alhazov, R. Freund, A. Riscos-Núñez. Membrane Division, Restricted Membrane Creation and Object Complexity in P Systems. *International Journal of Computer Mathematics*, volume 83, number 7, Taylor & Francis, 2006, pp. 529-548.
- [67] A. Alhazov, C. Martín-Vide, Yu. Rogozhin. On the Number of Nodes in Universal Networks of Evolutionary Processors. *Acta Informatica*, volume 43, number 5, Springer, 2006. pp. 331-339.
- [68] E. Boian, C.Ciubotaru, S. Cojocaru, A. Colesnicov, L. Malahov. Lexical resources for Romanian: creation, word inflection, checking. *Revista de Inventica. Romanian Journal for Creativity in Engineering and Technology – Research and Education Reports*. Nr.53,vol. X., an XVI-2006, pp. 27-32.
- [69] L. Pan, A. Alhazov. Solving HPP and SAT by P Systems with Active Membranes and Separation Rules. *Acta Informatica*, volume 43, number 2, Springer, 2006, pp. 131-145.

- [70] A. Alhazov, Yu. Rogozhin, S. Verlan: Minimal Cooperation in Symport/Antiport Tissue P Systems. *International Journal of Foundations of Computer Science*, volume 18, number 1, World Scientific, 2007, pp. 163-180.
- [71] Gh. Duca, C. Gaidric. A vision upon Science in a Knowledge Society, *Studies in informatics and Control*, v.16, N 4, pp. 445-452, Bucharest, 2007.
- [72] C. Ciubotaru. Practical approach to solution of the cyclic recurrence problem for attribute grammars. *Bulletin of the Academy of Sciences of Moldova. The series of Physical-Technical and Mathematical sciences*. No.2, 1991, pp. 32-39. (in Russian)
- [73] Yu. Rogozhin. Universal Turing machine with 10 states and 3 symbols. *Bulletin of the Academy of Sciences of Moldova. Mathematics*. Chisinau, 1992, No. 4 (10), pp. 80-82. (in Russian)
- [74] S. Cojocaru, M. Evstiunin, V. Ufnarovski. Detecting and correcting spelling errors for Romanian language. *Computer Science Journal of Moldova*, vol.1, no.1, 1993, pp. 3-22.
- [75] C. Gaidric, V. Ungureanu, D. Zaporozhan. A decision support system for Resources planning in scientific and technical programs, *Computer Science Journal of Moldova*, vol.1, no.2, 1993, pp. 105-109.
- [76] G. Magariu, V. Madan, L. Burteva. What does the simulation system SOL/PC do? *Computer Science Journal of Moldova*. vol.1, no.2, 1993, pp. 3-13.
- [77] Yu. Rogozhin, About Shannon's problem for Turing machines. *Computer Science Journal of Moldova*, vol.1, no.3(3), 1993, pp. 108-111.
- [78] N. Andronaty, A. Golovnea, Yu. Rogozhin, The structural robustness of multiprocessor computing system. *Computer Science Journal of Moldova*, vol.3, no.3, 1995, pp. 212-237.
- [79] S. Cojocaru, V. Ufnarovski. Noncommutative Groebner basis, Hilbert series, Anick's resolution and BERGMAN under MS DOS. *Computer Science Journal of Moldova*, vol.3, no.1, 1995, pp. 24-39.
- [80] A. Colesnicov. Message composition and its application to event-driven system construction. *Computer Science Journal of Moldova*, vol. 3, no. 2 (8), 1995, pp. 123-133.
- [81] A. Colesnicov. The Roumanian spelling checker ROMSP: the project overview. *Computer Science Journal of Moldova*, vol.3, no. 1 (7), 1995, pp. 40-54.
- [82] N. Shvets, C. Ciubotaru. Meta-generation of syntax-oriented editors. *Computer Science Journal of Moldova*, vol.3, no.1, 1995, pp. 3-9.
- [83] E. Boian, S. Cojocaru, L. Malahov. Some tools to implement linguistics applications oriented to the Romanian language. *Computer Science Journal of Moldova*, vol.4, no.2, 1996, pp. 204-223.
- [84] S. Cojocaru, E. Boian. The inflexion regularities for the Romanian language. *Computer Science Journal of Moldova*, vol.4, no.1, 1996, pp. 40-58.



- [85] A. Colesnicov. Implementation and usage of the Bergman package shell. *Computer Science Journal of Moldova*, vol. 4, no. 2 (11), 1996, pp. 260-276.
- [86] V. Demidova, T. Verlan. An approach to the word division into syllables for Romanian language. *Computer Science Journal of Moldova*, vol.4, no.1, 1996, pp. 59-68.
- [87] L.Burțeva. On the Architecture of Problem-Oriented Simulation Systems. *Computer Science Journal of Moldova*, vol.5, no.3(15), 1997, pp. 273-284.
- [88] C. Ciubotaru. Grammar flow analysis reduction to scheduling problem. *Computer Science Journal of Moldova*, vol.5, no.3(15), 1997, pp. 353-365.
- [89] C. Gaidric. Decision support systems. *Acta Academia, 1998 Intern. Informatization Academy*, Chișinău, Evrica, 1998, pp. 236-245. (In Russian)
- [90] G. Magariu. A technique of creation of simulation system with experiments design and analysis controlled by user queries, *Computer Science Journal of Moldova*, vol.6, no.3(18), 1998, pp. 286-293.
- [91] G. Magariu, I. Verlan, L. Burțeva. The simulation system of credit portfolio evaluation. *Computer Science Journal of Moldova*. vol.6, no.3(18), 1998, p.294-305.
- [92] M. Margenstern, Yu. Rogozhin. Some small self-describing Turing machines. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.6, no.1, 1998, pp. 57-82.
- [93] C. Gaidric. Decision support system for vehicle dispatching, *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.7, no. 1(19), 1999, pp. 86-104.
- [94] S. Cojocaru, V. Ufnarovski. Non-commutative computer algebra and molecular computing. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.9, no.3, 2001, pp. 369-377.
- [95] M. Kudlek, Yu. Rogozhin. Small Universal Circular Post Machines. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol. 9, no.1, 2001, pp. 34-52.
- [96] A. Tkachenko, A. Alhazov. The Multiobjective Bottleneck Transportation Problem. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol. 9, no. 3(27), 2001, pp. 321-335.
- [97] A. Alhazov, M. Kudlek, Yu. Rogozhin. Nine Universal Circular Post Machines. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol. 10, no. 3(30), 2002, pp. 247-262.
- [98] I. Attali, C. Ciubotaru, N. Meergus. Experimental functional realization of attribute grammar systems. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.10, no. 2(29), 2002, pp. 190-203.
- [99] S. Cojocaru, A. Colesnicov, L. Malahov. Network version of the computer algebra system Bergman. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.10, no.2, 2002, pp. 216-222.

- [100] C. Gaidric. The digital technologies as the chance for sustainable development of Moldova, *Computer Science Journal of Moldova*, ISSN 1561-4042, vol. 10, no. 1(28), 2002, pp. 53-58.
- [101] E. Boian, S. Cojocaru, V. Demidova. Resurse lexico-gramaticale și instrumentare pentru aplicații de limbaj natural. *Economica*, Nr.2 (42), 2003, Editura ASEM, pp. 99-103.
- [102] L. Burțeva. The comparative analysis of implementation practices of e-government services, *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.12, no. 3(36), 2004, pp. 457-466.
- [103] L. Burțeva, S. Cojocaru, C. Gaidric, G. Magariu, T. Verlan. Services in Public Administration (e-government); Privacy and Freedom of Information (review of study mode for situation in Moldova), *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.12 no. 3 (36), 2004, pp. 467-496.
- [104] S. Cojocaru, A. Colesnicov, L. Malahov. Interfaces to symbolic computation systems: reconsidering experience of Bergman. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol. 13, no.2, 2005, pp. 232-244.
- [105] A. Alhazov, Yu. Rogozhin. Generating Languages by P Systems with Minimal Symport/Antiport. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol. 14, no. 3(42), 2006, pp. 299-323.
- [106] S. Cojocaru. The assessment of the inflexion models for Romanian. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.14, no.1(40), 2006, pp. 103-112.
- [107] S. Cojocaru, A. Colesnicov, L. Malahov. Integrity and correctness checking of a lexical database. *Computer Science Journal of Moldova*, ISSN 1561-4042, vol.14, no. 1(40), 2006, pp. 138-151.
- [108] L. Burțeva, S. Cojocaru, C. Gaidric, E.Jantuan, SONARES-A decision support system in ultrasound investigation. *Computer Science Journal of Moldova* ISSN 1561-4042, vol.15, no.2 (44), 2007, pp. 153-177.
- [109] I. Coșuleanu, C. Gaidric. Distance voting (e-voting): the ways of its applicability in Moldova. *Computer Science Journal of Moldova*, v ISSN 1561-4042, vol.15, no.3 (45), 2007, pp. 354-380.
- [110] C. Gaidric, V.Ungureanu, D.Zaporojan. A decision support system for Resources planning in scientific and technical programs, *Advances in fuzzy Sets and applications*, Ed.Univ. Iași, 1990.
- [111] G. Magariu, L. Burțeva. Analysis of experiment results in simulation system SOL/PC, *Proceedings International AMSE Conference on Applied Modeling and Simulation*, Lviv, Ukrain, pp.51-62, 1993.
- [112] T. Verlan. Many words, but little place (about electronical dictionary of sinonims). *Proceedings of technical-scientific conference „Informatics and computing engineering”*, Chisinau, 1993, pp.40-43. (in Russian)

- [113] F. Dlikman, F. Frishberg, V. Sedyakin, G. Magariu, T. Tofan, L. Bureva. Evaluation of characteristics and choice of working regimes of geliogeophysical informational-calculational system according to simulation results, In: *Advances in Modeling & Analysis*, B, AMSE Press, Vol.31, 4, 1994, pp. 23-29.
- [114] G. Magariu. Model running visualization in simulation system SOL/PC, *Proceedings of European simulation meeting on simulation tools and applications*, Gyor, Hungary, 1995, pp. 217-223.
- [115] S. Cojocaru. *Lexicon român: instrumentar, implementare, utilizare. Limbaj i tehnologie*, Academia Română, București, 1996, p.37-40.
- [116] S. Cojocaru. *Romanian Lexicon: Tools, Implementation, Usage. Recent Advances in Romanian Language Technology*. Editors: D. Tufiş, P. Andersen. Editura Academiei Române, București, 1997, p.107-114.
- [117] C. Găindric. Decision support systems: concepts evolution and some perspectives. *Proceedings of International Symposium „Computers in Europe – past, present and future”*, Kiev, November 5-7, 1998, pp. 216-220. (in Russian)
- [118] . L. Priese, Yu. Rogozhin, M. Margenstern. Finite H-systems with 3 Test Tubes are not Predictable. In *Proceedings of Pacific Simposium on Biocomputing*, 3, Kapalua, Maui, January 1998, Hawaii, USA (R.Altman, A.Dunker, L.Hanter, T.Klein, eds.), World Sci.Publ., Singapore, 1998, pp.545-556.
- [119] E. Boian, S. Cojocaru, L. Malahov. *Instrumentar pentru aplicații lingvistice. Terminologia în România și Republica Moldova. ”Clusium”*, România, 2000, pp.38-41.
- [120] E. Boian, S. Cojocaru, L. Malahov. *Instruments pour applications linguistiques. La terminologie en Roumanie et en Republique de Moldova*, Hors serie, N4, 2000, p.42-44.
- [121] I. Attali, C. Ciubotaru. Functional realization of attribute grammar systems. *Proceedings of the 3-rd International Conference “Microelectronics and Computer Science”*, Technical University of Moldova, Chișinău, September 26-28, 2002, vol. II, p.87-91.
- [122] C. Găindric. Impact of transition to Informational Society in Moldova, *Proceedings of the 3rd International Conference on „Microelectronics and Computer Science” vol.2*, Chișinău, 2002, pp. 16-20.
- [123] J. Backelin, S. Cojocaru, V. Ufnarovski. *The Computer Algebra Package Bergman: Current State. Commutative Algebra, Singularities and Computer Algebra*. NATO Science Series, II Mathematics, Physics and Chemistry, Vol. 115, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003, pp. 75-100.
- [124] E. Boian, C.Ciubotaru, S. Cojocaru, A. Colesnicov, V. Demidova, L. Malahov. *Lexical resources for Romanian - a project overview*. Symposium on Intelligent Systems and Applications, September 19-20, 2003, Iași, Romania. Eds.: H.N.Teodorescu, G.Găindric, E.Sofron. Publisher: Tehnici și Tehnologii, Iași. ISBN 973-97737-2-9 (CD).
- [125] S. Cojocaru, V. Ufnarovski. *Non-Commutative Computer Algebra and Molecular Computing*. 2nd Annual Meeting of Project MolCoNet IST-2001-32008. November 27-29, 2003, Wien. Vienna University of Technology, 4 p.

- [126] G. Magariu, L. Burţeva. Simulation in bank management process. Trends in the development of the information and communication technologies in education and management. International conference. March 20-21, 2003. Chişinău, ASEM, 2003, pp. 182-185.
- [127] L.Burţeva, T.Verlan, C.Gaindric, S.Cojocaru, G.Magariu, C.Ciubotaru. Informational analitical system „Scientific potential of Moldova”, BIT+, III International Conference „Informational Technologies – 2003”, April 7-11, 2003, Chisinau, Moldova, V.3, pp.174-179.
- [128] B. Rybakin, G. Magariu, L. Burţeva, T. Verlan. Experimental data as initial and boundary conditions for mathematical model of a solid waste landfill. Mathematical modeling in education, science and production. Proceedings of III International scientific-practical conference, September 17-20, 2003, pp.52-53. (in Russian)
- [129] L. Burţeva, T. Verlan, C. Gaindric, S. Cojocaru, G. Magariu. The comparative analysis of different approaches to the e-government implementation: e-government services. Abstracts on BIT+ 2004 “IV International Conference on Information Technologies 2004”, 3-7 May, 2004, Chisinau, pp. 66-68. (in Russian)
- [130] S. Cojocaru, C. Gaindric. Moldova – căi de integrare digitală, BIT+ IV International Conference on Informational Technologies 2004, 3-7 mai, 2004, pp. 23-28.
- [131] J. Maffia, B.P. Rybakin, G..A. Magariu, L.V. Burţeva, T.B.Verlan. SoWaDec: Computer modeling of biogas generation processes. Proceedings of the Second Conference of the Mathematical Society of the Republic of Moldova, Chişinău, August 17-19, 2004, pp. 274-278.
- [132] O.Popcova, S. Cojocaru, C. Gaindric. Image processing in ultrasound diagnostic system. 8th International Symposium on Automatic Control and Computer Science, SACCs 2004. Iaşi, România. ISBN 973-621-086-3 (CD).
- [133] V. Rogojin, E. Boian. Simulation of Mobile Ambients by tissue P systems with a dynamic network of membranes. In: I. Dzitac, T. Maghiar, C. Popescu (Eds.), Proceedings of the International Conference on Computers and Communications - ICC3 2004, pp. 377-382, Editura Universităţii din Oradea, 2004.
- [134] A. Alhazov. Maximally Parallel Multiset-Rewriting Systems: Browsing the Configurations. In: M.A. Gutiérrez-Naranjo, A. Riscos-Núñez, F.J. Romero-Campero, D. Sburlan. RGNC Report, ISBN: 84-609-67719-9, University of Seville, Third Brainstorming Week on Membrane Computing, Fénix Editora, Sevilla, 2005, pp. 1-10.
- [135] A. Alhazov. Solving SAT by Symport/Antiport P Systems with Membrane Division. In: M.A. Gutiérrez-Naranjo, Gh. Păun, M.J. Pérez-Jiménez: Cellular Computing (Complexity Aspects), ESF PESC Exploratory Workshop, ISBN: 84-609-5338-6, Fénix Editora, Sevilla, 2005, pp. 1-6.
- [136] A. Alhazov, M. Cavaliere. Evolution-Communication P Systems: Time-freeness. In: M.A. Gutiérrez-Naranjo, A. Riscos-Núñez, F.J. Romero-Campero, D. Sburlan. RGNC Report, ISBN: 84-609-67719-9, University of Seville, Third Brainstorming Week on Membrane Computing, Fénix Editora, Sevilla, 2005, pp. 11-18.

- [137] A. Alhazov, R. Freund. P Systems with One Membrane and Symport/ Antiport Rules of Five Symbols are Computationally Complete. In: M.A. Gutiérrez-Naranjo, A. Riscos-Núñez, F.J. Romero-Campero, D. Sburlan: RGNC Report, ISBN: 84-609-67719-9, University of Seville, Third Brainstorming Week on Membrane Computing, Fénix Editora, Sevilla, 2005, pp. 19-28.
- [138] A. Alhazov, R. Freund, M. Oswald. Tissue P Systems with Antiport Rules and Small Number of Symbols and Cells. In: M.A. Gutiérrez-Naranjo, Gh. Păun, M.J. Pérez-Jiménez: Cellular Computing (Complexity Aspects), ESF PESC Exploratory Workshop, ISBN: 84-609-5338-6, Fénix Editora, Sevilla, 2005, pp. 7-22.
- [139] A. Alhazov, R. Freund, A. Riscos-Núñez. One and Two Polarizations, Membrane Creation and Objects Complexity in P Systems. Seventh International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC'05), IEEE Computer Society, 2005, pp. 385-394.
- [140] A. Alhazov, R. Freund, Yu. Rogozhin. Some optimal results on symport/antiport P systems with minimal cooperation. Cellular Computing (Complexity aspects). ESF PESC Exploratory Workshop, ISBN: 84-609-5338-6, Fénix Editora, Sevilla, Spain, January 31 – February 2, 2005, pp. 23 – 36.
- [141] A. Alhazov, Yu. Rogozhin. Minimal Cooperation in Symport/Antiport P Systems with one membrane. In: M.A. Gutiérrez-Naranjo, A. Riscos-Núñez, F.J. Romero-Campero, D. Sburlan: RGNC Report, ISBN: 84-609-67719-9, University of Seville, Third Brainstorming Week on Membrane Computing, Fénix Editora, Sevilla, 2005, pp. 29 - 34.
- [142] A. Alhazov, Yu. Rogozhin, S. Verlan. Symport/antiport tissue P systems with minimal cooperation. Cellular Computing (Complexity aspects). ESF PESC Exploratory Workshop, ISBN: 84-609-5338-6, Fénix Editora, Sevilla, Spain, January 31 – February 2, 2005, 37 – 52.
- [143] A. Alhazov, S. Verlan. Sevilla Carpets of Deterministic Non-cooperative P Systems. In: M.A. Gutiérrez-Naranjo, Gh. Păun, M.J. Pérez-Jiménez: Cellular Computing (Complexity Aspects), ESF PESC Exploratory Workshop, ISBN: 84-609-5338-6, Fénix Editora, Sevilla, 2005, pp. 53-60.
- [144] E. Boian, C.Ciubotaru, S. Cojocaru, A. Colesnicov, V. Demidova, L. Malahov. Technologization of Romanian: linguistic resources, applications, tools. Proceedings of the 4rd International Conference on Microelectronics and Computer Science. Vol.II, 2005, pp. 519-522.
- [145] E. Boian, S. Cojocaru, A. Colesnicov, L. Malahov, T.Baltaga. Development of Tools to inflect compound words in Romanian. Proceedings of the 4rd International Conference on Microelectronics and Computer Science. Vol.II, 2005, pp. 465-469.
- [146] L. Burțeva, S. Cojocaru, C. Gaidric, G. Magariu, T. Verlan. Digital divide: a glance at the problem in Moldova Proceedings of the 4rd International Conference on Microelectronics and Computer Science. Vol.II, 2005, pp. 23-29.

- [147] S. Cojocaru, A. Colesnicov, L. Malahov, V. Ufnarovski. Problems in interaction with the Computer Algebra System Bergman. Computational Commutative and Non-Commutative Algebraic Geometry. NATO Science Series. Series III: Computer and Systems Sciences – Vol.196, Eds.: S. Cojocaru, G. Pfister, V. Ufnarovski. IOS Press, 2005, pp. 185-198.
- [148] E. Ribac, S. Cojocaru, C. Gaidric, S. Puiu, V. Turcanu. The examination support in sonographic investigations Proceedings of the 4rd International Conference on Microelectronics and Computer Science. Technical University of Moldova, Chişinău Vol.II, 2005, pp. 271-274.
- [149] E. Ribac, S. Cojocaru, C. Gaidric, S. Puiu, V. Turcanu. The process of designing and implementing the examination support in sonographic investigations. The International conference „Advanced information and telemedicine technologies for health”, Nov.8-10, 2005, Minsk, Belarus. Proceedings, vol.2, pp. 44-47.
- [150] B. Rybakin, G. Maffia, G. Magariu, L. Burţeva, T. Verlan. Computer modelling of physical and biochemical processes of organics decomposition at solid waste landfills. Abstracts on 4th International Congress on Waste Management WasteTech-2005”, May 31-June 3, 2005, Moscow, pp. 246-247. (in Russian)
- [151] B. Rybakin, G. Magariu, L. Burţeva, T. Verlan, G. Maffia. The comparative analysis of some models of biogas generation processes Proceedings of the 4th International Conference on “Microelectronics and Computer Science” (Volume II), Technical University of Moldova, Chişinău, September 15-17, 2005, pp. 44-48.
- [152] A. Alhazov, C. Bonchiş, G. Ciobanu, C. Isbaşa: Encodings and Arithmetic Operations in P Systems. In: M.A. Gutiérrez-Naranjo, Gh. Păun, A. Riscos-Núñez, F.J. Romero-Campero: RGNC Report, ISBN: 84-611-0681-4, University of Seville, Fourth Brainstorming Week on Membrane Computing, volume 1, Fénix Editora, Sevilla, 2006, pp. 1-28.
- [153] A. Alhazov, M.J. Pérez-Jiménez. Uniform Solution to QSAT Using Polarizationless Active Membranes. In: M.A. Gutiérrez-Naranjo, Gh. Păun, A. Riscos-Núñez, F.J. Romero-Campero. RGNC Report, ISBN: 84-611-0681-4, University of Seville, Fourth Brainstorming Week on Membrane Computing, volume 1, Fénix Editora, Sevilla, 2006, pp. 29-40.
- [154] C. Ciubotaru, E. Boian, S. Cojocaru, A. Colesnicov, V. Demidova, L. Malahov, O. Burlaca. Resurse lingvistice reutilizabile. Lucrările atelierului „Resurse lingvistice și instrumente pentru prelucrarea limbii române”, Iaşi, Editura Universităţii „A.I.Cuza”, 2006, pp. 75-79.
- [155] C. Ciubotaru, E. Boian, S. Cojocaru, G. Magariu, T. Verlan, Iu. Rogojin. Sistem de instruire asistată de calculator pentru morfologia limbii române. Lucrările atelierului „Resurse lingvistice și instrumente pentru prelucrarea limbii române”, Iaşi, Editura Universităţii „A.I.Cuza”, 2006, pp. 135-139.
- [156] A. Alhazov, R. Freund, M. Oswald, S. Verlan: Partial Versus Total Halting in P Systems. In: M.A. Gutiérrez-Naranjo, Gh. Păun, A. Romero-Jiménez, A. Riscos-Núñez: RGNC Report, ISBN: 978-84-611-6776-0, University of Seville, Fifth Brainstorming Week on Membrane Computing, Fénix Editora, Sevilla, 2007, pp. 1-20.

- [157] C.Ciubotaru, E. Boian, S. Cojocaru, A. Colesnicov, V. Demidova, L. Malahov, G. Magariu, T. Verlan. Tehnologii pentru generarea sistemelor de instruire, dicționarelor electronice specializate și ghidurilor lingvistice. Proceedings of the 5th International Conference on Microelectronics and Computer Science ICMCS-2007, vol.I, Chișinău, Technical University of Moldova, 2007, pp. 20-23.
- [158] S. Cojocaru, C. Gaidric. Decision support system in ultrasound investigations, Proceedings XIII-th International conference KDS-2007, vol.1, ITHEA, Sofia, 2007, pp. 241-246.

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