



**VU Institute of Mathematics and Informatics**  
**Annual Report 2010**

Akademijos str. 4, LT-08663 Vilnius, Lithuania  
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**Director** – Prof. Habil. Dr. *Gintautas Dzemyda*

**STAFF** – 86 research fellows (24 habilitated doctors and 51 doctors), 69 doctoral students.

[Main research trends of the Institute](#)

[Doctoral Dissertations maintained in 2010](#)

[Conferences and Seminars organised in 2010](#)

[INFORMATICS METHODOLOGY DEPARTMENT](#)

[NUMERICAL ANALYSIS DEPARTMENT](#)

[PROBABILITY THEORY AND STATISTICS DEPARTMENT](#)

[RECOGNITION PROCESSES DEPARTMENT](#)

[SOFTWARE ENGINEERING DEPARTMENT](#)

[MATHEMATICAL LOGIC SECTOR of the SED](#)

[STOCHASTIC PROCESSES DEPARTMENT](#)

[SYSTEMS ANALYSIS DEPARTMENT](#)

[OPERATIONAL RESEARCH SECTOR of the SAD](#)

***MAIN RESEARCH TRENDS OF THE INSTITUTE***

Probability Theory and Mathematical Statistics; Finance and Actuarial Mathematics; Differential Equations and Numerical Methods for their Solution; Mathematical Logic and Algorithm Theory;

Recognition Processes, Data Analysis, Multi-Modal Optimization Problems, Multimedia Technologies and Interactive Systems, Software Engineering;

Theoretical and Methodical Fundamentals of Informatics, Information and Communication Technology (ICT) in Education, Computer Networks and Software Engineering Methods and Applications in the Creation of New Information Technologies.

***DOCTORAL DISSERTATIONS MAINTAINED IN 2010***

Jūratė Skūpienė [“Evaluation of Algorithm-Code Complexes in Informatics Contests”](#);

Remigijus Paulavičius [“Global Optimization with Simplicial Partitions”](#);

Virginijus Marcinkevičius [“Investigation and Functionality Improvement of Nonlinear Multidimensional Data Projection Methods”](#);  
Rasa Karbauskaitė [“Analysis of Multidimensional Data Visualization Methods That Preserve the Local Structure”](#);  
Povilas Treigys [“Development and Application of Methods in the Graphical Ophthalmological and Thermovisual Data Analysis”](#);  
Vaidas Giedrimas [“The Component Based Software Generation Method”](#);  
Živilė Jesevičiūtė [“The Eigenvalue Problem for Differential Operator with Nonlocal Integral Conditions”](#);  
Aleksej Bakšajev [“Statistical Tests Based on N-Distances”](#);  
Daiva Šveikauskienė [“Automatic Syntactic Analysis of Lithuanian Simple Sentences”](#);  
Sergėjus Ivanikovas [“The Problems of Parallel Computing in Multidimensional Data Visualization”](#).

#### **CONFERENCES AND SEMINARS ORGANIZED IN 2010**

[15th International Conference “Mathematical Modelling and Analysis”](#),  
May 26–29, 2010, Druskininkai, Lithuania;  
[26th Conference of Trans-European Research and Education Networking Association “TNC2010 – Terena Networking Conference 2010”](#),  
May 31–June 3, 2010, Vilnius;  
[10th International Vilnius Conference on Probability Theory and Mathematical Statistics](#),  
June 28–July 2, 2010, Vilnius;  
[Workshop on Survey Sampling Theory and Methodology](#),  
August 23–27, 2010, Vilnius;  
[9th Joint Conference on Knowledge-Based Software Engineering \(JCKBSE'10\)](#),  
August 25–27, 2010, Kaunas, Lithuania;  
[International Conference “Learning community for Web 2.0 teaching”](#),  
October 1–5, 2010, Vilnius;  
[2nd Workshop “Data analysis methods for software systems”](#),  
December 2–4, 2010, Druskininkai, Lithuania.

#### **INFORMATICS METHODOLOGY DEPARTMENT**

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Tel. 2109732 fax 2729209  
E-mail [valentina.dagiene@mii.vu.lt](mailto:valentina.dagiene@mii.vu.lt)  
**Head** – Prof. Dr. Valentina Dagiene

##### **Principal researchers:**

1. Prof. Habil. Dr. Valentina Dagiene,

##### **Researchers:**

1. Dr. Tatjana Jevsikova,
2. Dr. Jevgenij Kurilov,

##### **Assistant researchers:**

1. Viktoras Dagys,
2. Sirvydas Dagys,
3. Ieva Jonaitytė,
4. Sigita Pedzevičienė,

**Specialists:**

1. Jūratė Skūpienė,

**Technical assistants:**

1. Remigijus Andžius,
2. Martynas Budriūnas,
3. Gabrielė Daukšaitė,
4. Antanas Grincevičius,
5. Arvydas Purvinš,
6. Giedrė Svetikienė,
7. Rimantas Žakauskas,

**Doctoral students:**

1. Eglė Jasutė,
2. Anita Juškevičienė,
3. Svetlana Kubilinskienė,
4. Silvija Sėrikovienė,
5. Bronius Skūpas,
6. Jūratė Urbonienė,
7. Lina Zajačauskienė,
8. Inga Žilinskienė.

***RESEARCH INTERESTS***

Localization of digital resources, models of quality evaluation of educational system components, teaching programming and informatics

***RESEARCH PROJECTS CARRIED OUT IN 2010***

**Projects Supported by University Budget**

Theme: Research on specification, localization and evaluation of educational digital resources and electronics services

Main results: 1) analysis of peculiarities of lokalizing digital resources, 2) development of methods and models for evaluation of the quality of education system components, 3) derivation of basic informatics concepts and proof their appropriateness to use in contests

**Governmental Science Programmes and Research Projects Ordered by the Branch Ministries**

Science for business and society (Mokslas verslui ir visuomenei). Agreement Nr. S-VP2-1.4-ŪM-03-K-01-019. 2009-11-02–2011-10-31. Prof. V. Dagiienė

**Ordered Research Projects**

Development and revision of data of the Term Bank of the Republic of Lithuania. Agreement Nr. VP-6/2008. 2009-01-01–2010-12-31. S. Meškauskienė

**International Science Programmes and Projects**

te@ch.us - Learning community for Web 2.0 teaching.  
Ref. Nr. 504333-LLP-1-2009-1-DE-COMENIUS-CMP. 2009–2011. Prof. V. Dagiene  
Nordic Network for Engineering Education Research (NNEER). 2009–2012. Prof. V. Dagiene

## **MAIN PUBLICATIONS**

### **MONOGRAPH**

[**Dagiene, Valentina**]; [**Grigas, Gintautas**]; Jevsikova, Tatjana. Programinės įrangos lokalizavimas / Valentina Dagiene, Gintautas Grigas, Tatjana Jevsikova. Vilnius : Matematikos ir informatikos institutas, 2010. 327 p. : iliustr. ISBN 9789986680468.

### **ARTICLES**

[**Dagiene, Valentina**]. Pagrindinių informatikos konceptų ugdymas pasitelkiant varžybas / Valentina Dagiene // Pedagogika. ISSN 1392-0340. T. 98 (2010), p. 91-99. Prieiga per internetą: <<http://www.senoji.vpu.lt/pedagogika/PDF/2010/98/dag91-99.pdf>>.

[**Dagiene, Valentina**]. Sustaining informatics education by contests / Valentina Dagiene // Lecture notes in computer science. ISSN 0302-9743. Vol. 5941 (2010), P. 1-12. Prieiga per internetą: <<http://www.springerlink.com/content/2wr821w3jl802h75/?p=8015f5ff649046b09671f7777f33aca5&pi=0>>.

[**Dagiene, Valentina**]; Jevsikova, Tatjana. An approach to formalize meta-information of software localizable resources / Valentina Dagiene, Tatjana Jevsikova // Informatica. ISSN 0868-4952. Vol. 21, no. 3 (2010), p. 321-338. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO801.htm>>.

[**Dagiene, Valentina**]; [**Jonaitytė, Ieva**]; Paltanavičius, Adomas. Tarptautinės informacinių technologijų varžybos: modelis ir patirties analizė / Valentina Dagiene, Ieva Jonaitytė, Adomas Paltanavičius // Informacijos mokslai. ISSN 1392-0561. T. 53 (2010), p. 86-99. Prieiga per internetą: <[http://www.leidykla.vu.lt/fileadmin/Informacijos\\_mokslai/53/86-99.pdf](http://www.leidykla.vu.lt/fileadmin/Informacijos_mokslai/53/86-99.pdf)>.

[**Dagiene, Valentina**]; [**Kurilov, Jevgenij**]. Web 2.0 technologies and applications in the best practice networks and communities / Valentina Dagiene, Eugenijus Kurilovas // Informatics in education. ISSN 1648-5831. Vol. 9, no. 2 (2010), p. 185-197. Prieiga per internetą: <[http://www.mii.lt/informatics\\_in\\_education/htm/INFE175.htm](http://www.mii.lt/informatics_in_education/htm/INFE175.htm)>.

[**Dagiene, Valentina**]; [**Skūpienė, Jūratė**]. Olympiads in informatics : competitive learning of programming for secondary school students / V. Dagiene and J. Skupiene // A new learning paradigm: competition supported by technology. Madrid : Sello Editorial, 2010. ISBN 9788493758035. P. 107-126.

[**Kubilinskienė, Svetlana**]; [**Dagiene, Valentina**]. Technology-based lesson plans: preparation and description / Svetlana Kubilinskienė, Valentina Dagiene // Informatics in education. ISSN 1648-5831. Vol. 9, no. 2 (2010), p. 217-228. Prieiga per internetą: <[http://www.mii.lt/informatics\\_in\\_education/htm/INFE172.htm](http://www.mii.lt/informatics_in_education/htm/INFE172.htm)>.

[**Kurilov, Jevgenij**]; [**Dagiene, Valentina**]. eLearning in Lithuania - II / Eugenijus Kurilovas, Valentina Dagiene // Cases on challenges facing e-learning and national development : institutional studies and practices. Vol. I. Eskisehir : Anadolu university, 2010. ISBN 9789759859084. P. 389-410. Prieiga per internetą: <[http://www.midasebook.com/dosyalar/Vol1\\_DCB.pdf](http://www.midasebook.com/dosyalar/Vol1_DCB.pdf)>.

[**Kurilov, Jevgenij**]; [**Dagiene, Valentina**]. Multiple criteria evaluation of quality and optimisation of e-learning system components Eugenijus Kurilovas and Valentina Dagiene // Electronic journal of e-learning [elektroninis išteklius]. ISSN 1479-4403. Vol. 8, iss. 2 (2010), p. 141-150. Prieiga per internetą: <<http://www.ejel.org/Volume-8/v8-i2/v8-i2-art-10.htm>>.

[**Kurilov, Jevgenij**]; [**Sėrikovienė, Silvija**]. Learning content and software evaluation and personalisation problems / Eugenijus Kurilovas, Silvija Sėrikovienė // Informatics in education. ISSN 1648-5831. Vol. 9, no. 1 (2010), p. 91-114. Prieiga per internetą: <[http://www.mii.lt/informatics\\_in\\_education/htm/INFE156.htm](http://www.mii.lt/informatics_in_education/htm/INFE156.htm)>.

[**Skūpas, Bronius**]. Feedback improvement in automatic program evaluation systems / Bronius Skūpas // Informatics in education. ISSN 1648-5831. Vol. 9, no. 2 (2010), p. 229-237. Prieiga per internetą: <[http://www.mii.lt/informatics\\_in\\_education/htm/INFE173.htm](http://www.mii.lt/informatics_in_education/htm/INFE173.htm)>.

[**Skūpienė, Jūratė**]. Improving the evaluation model for the Lithuanian informatics olympiads / Jūratė Skūpienė // Informatics in education. ISSN 1648-5831. Vol. 9, no. 1 (2010), p. 141-158. Prieiga per internetą: <[http://www.mii.lt/informatics\\_in\\_education/htm/INFE155.htm](http://www.mii.lt/informatics_in_education/htm/INFE155.htm)>.

## **MATERIALS OF CONFERENCES**

Cartelli, Antonio; [**Dagienė, Valentina**]; Futschek, Gerald. Bebras contest and digital competence assessment : analysis of frameworks / Antonio Cartelli, Valentina Dagiene, Gerald Futschek // International journal of digital literacy and digital competence. ISSN 1947-3494. Vol. 1, iss. 1 (2010), p. 24-39.

[**Dagienė, Valentina**]; Futschek, Gerald. Introducing informatics concepts through a contest Valentina Dagiene, Gerald Futschek // IFIP working conference: New developments in ICT and education [elektroninis išteklius]. Amiens : Universite de Picardie Jules Verne, 2010. ISBN 9782953728514. P. 1-15. Prieiga per internetą: <[http://publik.tuwien.ac.at/files/PubDat\\_186636.pdf](http://publik.tuwien.ac.at/files/PubDat_186636.pdf)>.

[**Dagienė, Valentina**]; [**Jonaitytė, Ieva**]. "Bebras" - žaiskime ir varžykimės drauge / Valentina Dgienė, Ieva Jonaitytė // Mokymosi bendruomenė ir antrosios kartos saityno (Web 2.0) technologijos : tarptautinės konferencijos pranešimai. Vilnius : Matematikos ir informatikos institutas, 2010. ISBN 9789986680482. P. 34-39. Prieiga per internetą: <<http://ims.mii.lt/Web20Mokymui/mokymosi-bendruomene.pdf#view=FitH,100>>.

[**Dagienė, Valentina**]; [**Juškevičienė, Anita**]. "Te@ch.us" projektas - pasitelkime Web 2.0 technologijas mokymui ir mokymuisi / Valentina Dagienė, Anita Juškevičienė // Mokymosi bendruomenė ir antrosios kartos saityno (Web 2.0) technologijos : tarptautinės konferencijos pranešimai. Vilnius : Matematikos ir informatikos institutas, 2010. ISBN 9789986680482. P. 40-46. Prieiga per internetą: <<http://ims.mii.lt/Web20Mokymui/mokymosi-bendruomene.pdf#view=FitH,100>>.

[**Dagys, Viktoras**]; [**Grigas, Gintautas**]. Programavimo stilius ir programų internacionalizavimo mokymas / Viktoras Dagys, Gintautas Grigas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 85-90. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

Igniško, Elvyra; [**Kurilov, Jevgenij**]. Mokymosi objektų daugkartinio panaudojamumo principų ir jų kokybės vertinimo modelio sąryšio analizė / E. Igniško, E. Kurilovas // Studentų moksliniai darbai. 2008-2010 m. : konferencijos medžiaga. Vilnius : Petro ofsetas, 2010. ISBN 9786094200694. P. 32-35.

Igniško, Elvyra; [**Kurilov, Jevgenij**]. Mokymosi objektų vertinimo ir daugkartinio naudojimo tyrimas / Elvyra Igniško, Eugenijus Kurilovas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 256-261. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_Taikymu\\_II\\_sekcija%28250-335%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_Taikymu_II_sekcija%28250-335%29.pdf)>.

[**Juškevičienė, Anita**]. Antros kartos saitynas ir švietimas / Anita Juškevičienė // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 103-108. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

[**Kubilinskienė, Svetlana**]; [**Dagienė, Valentina**]. Pamokų planų šablonai: analizė ir technologijų taikymas / Svetlana Kubilinskienė, Valentina Dagienė // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 115-120. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

[**Kurilov, Jevgenij**]; Birenienė, Virginija. Application of multiple criteria decision analysis model and method for evaluation of quality of learning objects for physics subject in eQNET project / Eugenijus Kurilovas, Virginija Birenienė // Gamtamokslinis ugdymas bendrojo lavinimo mokykloje - 2010 : XVI nacionalinės mokslinės-praktinės konferencijos straipsnių rinkinys, Anykščiai, 2010 m. balandžio mėn. 23-24 d. Šiauliai : Lucilijus, 2010. ISBN 9789955320968. P. 84-89.

**Kurilov, Jevgenij**; Birenienė, Virginija. "INSPIRE" projekto skaitmeninių mokymo priemonių naudojimo fizikos pamokose tyrimas / Eugenijus Kurilovas, Virginija Birenienė // Gamtamokslinis ugdymas bendrojo lavinimo mokykloje - 2010 : XVI nacionalinės mokslinės-praktinės konferencijos straipsnių rinkinys, Anykščiai, 2010 m. balandžio mėn. 23-24 d. = Natural science education at a general school - 2010 : proceedings of the Sixteenth national scientific-practical conference, Anykščiai, 23-24 April, 2010. Šiauliai : Lucilijus, 2010. ISBN 9789955320968. P. 78-83.

[**Kurilov, Jevgenij**]; Birenienė, Virginija; [**Sėrikovienė, Silvija**]. Evaluation of quality of learning objects: several scientific approaches / Eugenijus Kurilovas, Virginija Birenienė and Silvija Serikoviene // Proceedings of the 9th European conference on e-learning : Instituto Superior de Engenharia do Porto, Portugal, 4-5 November 2010. Vol. 1. Reading : Academic publishing limited, 2010. ISBN 9787906638825. P. 291-299.

[**Kurilov, Jevgenij**]; [**Sėrikovienė, Silvija**]. Application of scientific approaches for evaluation of quality of learning objects in eQNet project / Eugenijus Kurilovas and Silvija Serikoviene // Knowledge management, information systems, e-learning, and sustainability research : third world summit on the knowledge society,

WSKS 2010 : Corfu, Greece, September 22-24, 2010 : Proceedings. Part 1. Berlin ; Heidelberg : Springer, 2010. ISBN 9783642163173. P. 438-443.

[**Kurilov, Jevgenij**]; [**Sėrikovienė, Silvija**]. Personalisation of learning objects and environments for informatics science education in Lithuania / Eugenijus Kurilovas, Silvija Serikoviene // ISSEP 2010 : proceedings of short communications : 4th international conference on informatics in secondary schools: evolution and perspectives : Zürich, Switzerland, January 13-15, 2010. Zürich : ETH, 2009. ISBN 9783909386284. P. 52-72. Prieiga per internetą: <[http://www.issep2010.org/proceedings\\_of\\_short\\_communications.pdf](http://www.issep2010.org/proceedings_of_short_communications.pdf)>.

Pohl, Wolfgang; Burton, Benjamin A.; [**Dagienė, Valentina**]; Fakcharoenphol, Jittat; Forišek, Michal; Hiron, Mathias; Opmanis, Martiņš; [**Skūpas, Bronius**]; Vegt, Willem van der. Get Involved! The IOI workshop 2010, its goals and results / Wolfgang Pohl ... [et al.] // Olympiads in informatics. ISSN 1822-7732. Vol. 4 (2010), p. 158-169. Prieiga per internetą: <[http://www.mii.lt/olympiads\\_in\\_informatics/htm/INFOL066.htm](http://www.mii.lt/olympiads_in_informatics/htm/INFOL066.htm)>.

[**Račkauskienė, Santa**]; Šiaučiūnas, Darius. Joint universality of some zeta-functions. I / Santa Račkauskienė, Darius Šiaučiūnas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 45-50. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Algebros\\_ir\\_Skaiciavimu\\_Teorijos\\_sekcija%2825-50%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Algebros_ir_Skaiciavimu_Teorijos_sekcija%2825-50%29.pdf)>.

[**Sėrikovienė, Silvija**]; [**Kurilov, Jevgenij**]. Matematikos mokymosi objektų daugkartinio panaudojamumo kokybės vertinimas eQNet projekte / Silvija Sėrikovienė, Eugenijus Kurilovas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 319-324. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_Taikymu\\_II\\_sekcija%28250-335%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_Taikymu_II_sekcija%28250-335%29.pdf)>.

[**Skūpas, Bronius**]. Automatinio ir pusiau automatinio vertinimo ypatumai IT valstybiniame brandos egzamine / Bronius Skūpas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 154-159. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

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Vinogradova, Irina; [**Kurilov, Jevgenij**]. Elektroninių kursų projektavimas "IBM authoring tool" įrankiu / Irina Vinogradova, Eugenijus Kurilovas // Informacinės technologijos 2010: teorija, praktika, inovacijos : mokslinės praktinės konferencijos pranešimų medžiaga. Alytus : Alytaus kolegija, 2010. ISBN 9786098020106. P. 92-97.

Vinogradova, Irina; [**Kurilov, Jevgenij**]. Nuotolinių studijų kokybės vertinimas / Irina Vinogradova, Eugenijus Kurilovas // Mokslo taikomųjų tyrimų įtaka šiuolaikinių studijų kokybei : respublikinės konferencijos mokslinių straipsnių rinkinys. ISSN 2029-2279. [2010] (2010), P. 99-103.

Vinogradova, Irina; [**Kurilov, Jevgenij**]. Studentų adaptuotų nuotolinių kursų kokybės vertinimas / Irina Vinogradova, Eugenijus Kurilovas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 170-175. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

[**Zajančkauskienė, Lina**]. Programinės įrangos kurtiesiems ir neprigirdintiesiems lokalizavimo ypatumai / Lina Zajančkauskienė // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 448-453. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Teorines\\_Informatikos\\_sekcija%28431-453%29%20.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Teorines_Informatikos_sekcija%28431-453%29%20.pdf)>.

[**Žilinskienė, Inga**]. Matematikos mokymas ir Web 2.0 technologijos / Inga Žilinskienė // Mokymosi bendruomenė ir antrosios kartos saityno (Web 2.0) technologijos : tarptautinės konferencijos pranešimai. Vilnius : Matematikos ir informatikos institutas, 2010. ISBN 9789986680482. P. 103-108. Prieiga per internetą: <<http://ims.mii.lt/Web20Mokymui/mokymosi-bendruomene.pdf#view=FitH,100>>.

[**Žilinskienė, Inga**]. Mokymosi objektai matematikai mokyti / Inga Žilinskienė // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 176-181. Prieiga per internetą:

<[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

### **COOPERATION**

Aalto university (Finland): V. Dagienė has Special course in computing education research for doctoral students (T-106.6500)

Davidson Institute of Science Education, Weizmann Institute of Science  
University of Eastern Finland of Joensuu and Kuopio

### **OTHER SCIENTIFIC ACTIVITIES**

V. Dagienė (<http://ims.mii.lt/valentina/en/index.htm>)

- Editor-in-Chief of two international journals “Informatics in Education“ (since 2002) and “Olympiads in Informatics”
- Member of ESF Standing Committee for the Physical and Engineering Sciences – PESC in 2009-2013
- Expert of EU Eurostars Programme
- Representative of Lithuania in Education Committee TC3 under the International Federation for Information Processing (IFIP)
- Vice chair of the Technical Committee of IFIP for Education (TC3)
- Member of Steering Committee of International Olympiads in Informatics

E. Kurilovas

- Member of Steering Committee of European Schoolnet (or EUN, the network of 31 European Ministries of Education)
- Member of Lithuanian national CEDEFOP and ReferNet Committees
- Expert-evaluator: PHARE, Leonardo da Vinci, eContentplus programmes, European Regional Development Fund
- Expert on preparation of feasibility studies and project documentation: European Commission, Ministry of Education and Science of Lithuania, Central Project Management Agency under the Ministry of Finance of Lithuania

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Laura LUKŠAITĖ-BALAKAUSKIENĖ, Jevgenija PAVLOVA, Santa RAČKAUSKIENĖ

## **RESEARCH PROJECTS CARRIED OUT IN 2010**

### **Projects Supported by University Budget:**

1. Differential problems with nonlocal boundary conditions and numerical methods of their realization. Prof. M. Sapagovas, Assoc. Prof. A. Štikonas, 2008-2010

ADI method for a two dimensional Poisson equation in a rectangle domain with a weighted integral boundary condition in one coordinate direction was considered. Sufficient conditions of stability for ADI method were investigated. A third-order linear differential equation with three additional conditions was analysed. Two Green's functions for two such problems with different additional conditions were compared. A Sturm–Liouville problem with one classical first type boundary condition and other nonlocal integral boundary condition was considered. Complex eigenvalues of these problems were investigated.

2. Boundary value problems of systems of degenerate elliptic equations and the Navier-Stokes systems in the domains of complicated geometry, Prof. S. Rutkauskas, 2009-2011

System of linear second-order ODEs with an irregular singular point are considered. The matrix that relates to the equation of this system is nonnormal. That implies some complications with respect to the statement of the weighted boundary-value condition at the singular point. A well-posed weighted boundary-value problem to the considered system of ODEs was proposed and the existence and uniqueness of its solution was proven.

### **Projects, Programmes, Issues Supported by Lithuanian State Science and Studies Foundation**

Olga Štikonienė: Development of Bioelectrocatalysis for Synthesis and Analysis. Prof. F. Ivanauskas. 2008-2010. (BIOSA)" Nr. N-08007.

The behaviour of the electrochemical glucose biosensor based on the glucose oxidase was examined in the diffusion and the kinetic modes of the action. The sensitivity and linearity of the biosensor can be monitored changing the permeability of the outer membrane of the biosensor. The mathematical model based on the enzymatic conversion of the substrate and the diffusion of the substrate was created. The influence of the fluctuations of the membrane thickness, the diffusion coefficients and pH were modelled and their impact was evaluated at different modes of an action of the biosensor.

## **MAIN PUBLICATIONS**

### **ARTICLES**

[Roman, Svetlana]; [Štikonas, Artūras]. Third-order linear differential equation with three additional conditions and formula for Green's function / S. Roman and A. Štikonas // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 3 (2010), p. 426-446. Prieiga per internetą: <<http://www.springerlink.com/content/h502365018214724/>>.

[Štikonienė, Olga]; Ivanauskas, Feliksas; Laurinavičius, Valdas. The influence of external factors on the operational stability of the biosensor response / Olga Štikonienė, Feliksas Ivanauskas, Valdas Laurinavičius // Talanta. ISSN 0039-9140. Vol. 81, iss. 4-5 (2010), p. 1245-1249. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.talanta.2010.02.016>>.



[**Rutkauskas, Stasys**]. On the well-posedness of a weighted boundary-value problem for systems of ODEs with singularity / S. Rutkauskas // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 3 (2010), p. 447-458. Prieiga per internetą: <<http://www.springerlink.com/content/p57877x9q8416k32/>>.

### **MATERIALS OF CONFERENCES**

<vėluojanti> Bekešienė, Svajonė; Baušys, Romualdas; [**Kleiza, Vytautas**]; Pincevičius, A.. The intelligent technologies application for artillery control / S. Bekešienė ... [et al.] // Intelligent technologies in logistics and mechatronics systems : ITELMS'2009 : proceedings of the 4th international conference : June 04-05, 2009, Panevėžys, Lithuania. Kaunas : Technologija, 2009. ISBN 9789955257059. P. 164-168.

<vėluojanti> Bekešienė, Svajonė; Baušys, Romualdas; [**Kleiza, Vytautas**]; Pincevičius, A.. The effective use of the intelligent technologies in planning infantry attacks / S. Bekešienė ... [et al.] // Intelligent technologies in logistics and mechatronics systems : ITELMS'2009 : proceedings of the 4th international conference : June 04-05, 2009, Panevėžys, Lithuania. Kaunas : Technologija, 2009. ISBN 9789955257059. P. 169-173.

<vėluojanti> Bekešienė, Svajonė; [**Kleiza, Vytautas**]; Malovikas, A.. Military specialist preparation features in nowadays environment / S. Bekešienė, V. Kleiza, A. Malovikas // Intelligent technologies in logistics and mechatronics systems : ITELMS'2009 : proceedings of the 4th international conference, June 04-05, 2009, Panevėžys, Lithuania. Kaunas : Technologija, 2009. ISBN 9789955257059. P. 158-163.

[**Mackevičius, Mažvydas**]; Ivanauskas, Feliksas; Kareiva, Aivaras. Itrio aliuminio granato sintezės kompiuterinis modeliavimas / Mažvydas Mackevičius, Feliksas Ivanauskas, Aivaras Kareiva // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 291-294. Prieiga per internetą:

<[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_Taikymu\\_II\\_sekcija%28250-335%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_Taikymu_II_sekcija%28250-335%29.pdf)>.

[**Roman, Svetlana**]; [**Štikonas, Artūras**]. Linear ODE with nonlocal boundary conditions and Green's functions for such problems / Svetlana Roman, Artūras Štikonas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 379-384.

[**Rutkauskas, Stasys**]; Saburov, Igor. On the weighted boundary value problem for systems of degenerate ordinary differential equations / Stasys Rutkauskas, Igor Saburov // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 57-62. Prieiga per internetą:

<[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Diferencialiniu\\_Lygciu\\_ir\\_Funkciju\\_Teorijos\\_sekcija%2851-62%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Diferencialiniu_Lygciu_ir_Funkciju_Teorijos_sekcija%2851-62%29.pdf)>.

[**Skučaitė, Agnė**]; [**Skučaitė-Bingelė, Kristina**]; Pečiulytė, Sigita; [**Štikonas, Artūras**]. Investigation of the spectrum for the Sturm–Liouville problem with one integral boundary condition / A. Skučaitė ... [et al.] // Nonlinear analysis: modelling and control. ISSN 1392-5113. Vol. 15, no. 4 (2010), p. 501-512. Prieiga per internetą: <<http://www.lana.lt/journal/39/Skucaitė.pdf>>.

[**Štikonienė, Olga**]; [**Sapagovas, Mifodijus**]. Numerical investigation of alternating-direction method for Poisson equation with weighted integral conditions / Olga Štikonienė, Mifodijus Sapagovas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 385-390. Prieiga per internetą:

<[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Skaiciavimo\\_Matematikos\\_sekcija%28362-390%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Skaiciavimo_Matematikos_sekcija%28362-390%29.pdf)>.

### **COOPERATION**

#### **OTHER SCIENTIFIC ACTIVITIES**

K. Pileckas:

1. Editorial board member of the journal „Mathematical Modelling and Analysis“  
<http://www.informaworld.com/tmma>
2. Editorial board member of the journal „Lithuanian Mathematical Journal“  
<http://www.springer.com/mathematics/journal/10986>
3. Editorial board member of the journal „Mathematical Fluid Mechanics“  
<http://www.springer.com/birkhauser/physics/journal/21>

A. Štikonas:

1. Editorial board member of the journal „Mathematical Modelling and Analysis“  
<http://www.informaworld.com/tmma>
2. Editorial board member of the journal „Lithuanian Mathematical Journal“  
<http://www.springer.com/mathematics/journal/10986>

3. Member of Scientific Committee of Conference MMA2010 “ <http://inga.vgtu.lt/~art/konf>
4. Editorial board member of the journal „Lietuvos Matematikos Rinkinys. LMD darbai “ <http://inga.vgtu.lt/~art/LMD>

A. Laurinčikas:

1. Editorial board member of the journal „Lithuanian Mathematical Journal“ <http://www.springer.com/mathematics/journal/10986>

S. Rutkauskas:

1. Editorial board member of the journal „Mathematical Modelling and Analysis“ <http://www.informaworld.com/tmma>
2. Editorial board member of the journal „Lietuvos Matematikos Rinkinys. LMD darbai “ <http://inga.vgtu.lt/~art/LMD>
3. Editorial board member of the journal „Lithuanian Mathematical Journal“ <http://www.springer.com/mathematics/journal/10986>
4. Member of Scientific Committee of Conference LMD LI, 2010

M. Sapagovass:

1. Editorial board member of the journal „Mathematical Modelling and Analysis“ <http://www.informaworld.com/tmma>
2. Chief Editor of the journal „Lithuanian Mathematical Journal“ <http://www.springer.com/mathematics/journal/10986>
3. Chief Editor of the journal „Nonlinear Analysis: Modelling and Control“ <http://www.lana.lt>
4. Member of Scientific Committee of Conference MMA2010 <http://inga.vgtu.lt/~art/konf>
5. Member of Scientific Committee of Conference LMD LI, 201

V. Kleiza

1. Member of Scientific Committee of Conference ITELM'2010  
[http://www.ktu.lt/lt/apie\\_renginius/konferencijos/2010/k10\\_06/INVITATION\\_ITELMS\\_2010.doc](http://www.ktu.lt/lt/apie_renginius/konferencijos/2010/k10_06/INVITATION_ITELMS_2010.doc)
2. Editorial board member of the journal „Nonlinear Analysis: Modelling and Control“ <http://www.lana.lt>

## PROBAILITY THEORY AND STATISTICS DEPARTMENT

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### STAFF

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4. Prof. Habil. Dr. Eugenijus Manstavičius
5. Dr. (HP) Saulius Norvidas,
6. Prof. Habil. Dr. Vygantas Paulauskas,
7. Prof. Habil. Dr. Rimantas Rudzakis.

#### **Senior researchers:**

1. Prof. Dr. Olga Januškevičienė,

2. Doc. Dr. Danutė Krapavickaitė,
3. Doc. Dr. Aleksandras Plikusas,
4. Doc. Dr. Marijus Radavičius.

**Junior researchers:**

3. Dainius Dzindzalieta,
4. Dr. Arūnas Grigelionis,
5. Matas Šileikis.

**Specialist:**

2. Monika Vilkienė

**Technical assistants:**

8. Jurgita Zinkevičienė

**Doctoral students:**

9. Dainius Dzindzalieta,
10. Karolina. Piaseckienė,
11. Matas Šileikis.

***RESEARCH INTERESTS***

Limit theorems for weakly dependent random variables, vectors and random fields (J. Sunklodas)

Rates of Convergence, Second Degree Polynomials, U-statistics, Estimations of the Parameters of Stable Laws, Diophantine Approximations, Estimations of Stability of Characterization (O. Januškevičienė).

Extremal problems in measures and functions theory (S. Norvidas).

Nonparametric and adaptive statistical methods, analysis of high-dimensional data and sparse categorical data, cluster analysis, applications in biostatistics and econometrics (M. Radavičius).

Statistical estimations of distributions, classification, applications of statistical methods in macroeconomical analysis (R. Rudzkis).

***RESEARCH PROJECTS CARRIED OUT IN 2010***

**Projects Supported by University Budget:**

**1. Statistical properties of complex random systems.** Prof. V. Bentkus (till 2010 06 03), Prof. J.K. Sunklodas (since 2010 06 03). 2010–2012.

Tail probabilities of sums of Bernoulli random variables have been investigated (D. Dzindzalieta).

A general maximal integral concentration problem has been considered (A. Grigelionis, S. Norvidas).

Bandlimited signals have been approximated by signals of finite lattice spectrum (A. Grigelionis, S. Norvidas).

Asymptotic rate of convergence in some kinds of U-statistics of second order were investigated. In view of the equality of eigenvalues and some moment conditions, it was proved that the limit distribution of the second-order U-statistic possesses the property of stability in the sense that it is independent of the distribution of the initial random variable  $X$  (O. Januškevičienė).

So called DPR type estimators for the tail index estimation were investigated. A new class of such estimators proposed. Asymptotic properties (including asymptotic of the bias and

asymptotic normality) of the new estimators are obtained. (V. Paulauskas with M. Vaiciulis). Strong law of large numbers for sums of linear random fields is proved (V. Paulauskas).

The optimal estimate of a smooth metric in the central limit theorem has been obtained for Fi-mixed random variables where the Fi-mixing coefficient is defined between 'past' and 'future' (J. Sunklodas).

Inequalities for the stop-loss premium have been obtained in the case of unimodal risks which are stochastically dominated by given random variables (M. Šileikis).

## **2. Development of composite algorithms of multivariate statistics and their applications in econometrics and biometrics.** Prof. R. Rudzkis. 2008–2010.

An estimator, based on semiparametric model, of total of a variable in finite population is proposed (D. Krapavickaitė).

In finite population setting, calibrated estimators of several types for covariance are constructed and their efficiency is compared by simulation (A. Plikusas).

Tests for sparse contingency tables based on their profile statistics are proposed (M. Radavičius).

### **Projects, Programmes, Issues Supported by Lithuanian State Science and Studies Foundation**

The project „Concentration of measures and functions“ supported by the Research Council of Lithuania (adv. S. Norvidas).

### **International Science Programmes and Projects**

V. Bentkus, D. Dzindzlieta and S. Norvidas were invited as guests to Bielefeld university Collaborative Research Centre „Spectral Structures and Topological Methods in Mathematics“.

## **MAIN PUBLICATIONS**

### **ARTICLES**

Balys, Vaidas; [Rudzkis, Rimantas]. Statistical Classification of Scientific Publications / Vaidas Balys, Rimantas Rudzkis // Informatica. ISSN 0868-4952. Vol. 21, no. 4 (2010), p. 471-486. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO803.htm>>.

Banys, Povilas; Davydov, Youri; [Paulauskas, Vygantas]. Remarks on the SLLN for linear random fields / Povilas Banys, Youri Davydov and Vygantas Paulauskas // Statistics & probability letters. ISSN 0167-7152. Vol. 80, iss. 5-6 (2010), p. 489-496. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.spl.2009.11.026>>.

[Januškevičienė, Olga]. Asymptotic rate of convergence in the degenerate U-statistics of second order / Olga Yanushkevichiene // Banach center publications. ISSN 0137-6934. Vol. 90 (2010), p. 275-284.

Januškevičius, Romanas; [Januškevičienė, Olga]. On the stability of characterizations by an identical distribution property / R. Yanushkevichius and O. Yanushkevichiene // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 3 (2010), p. 489-494. Prieiga per internetą: <<http://www.springerlink.com/content/05w17820345w873m/>>.

[Manstavičius, Eugenijus]. On some densities in the set of permutations Eugenijus Manstavičius // The electronic journal of combinatorics [elektroninis išteklius]. ISSN 1077-8926. Vol. 17, iss. 1 (2010), p. R100-1-15. Prieiga per internetą: <[http://www.combinatorics.org/Volume\\_17/PDF/v17i1r100.pdf](http://www.combinatorics.org/Volume_17/PDF/v17i1r100.pdf)>.

[Manstavičius, Eugenijus]. Total variation approximation for random assemblies and a functional limit theorem / Eugenijus Manstavičius // Monatshefte für Mathematik. ISSN 0026-9255. Vol. 161, no. 3 (2010), p. 313-334. Prieiga per internetą: <<http://www.springerlink.com/content/b213u4k750u33t2j/>>.

[**Norvidas, Saulius**]. Approximation of bandlimited functions by trigonometric polynomials / S. Norvidas // Acta mathematica Hungarica. ISSN 0236-5294. Vol. 128, no. 1-2 (2010), p. 26-35. Prieiga per internetą: <<http://www.springerlink.com/content/d6x7258211861186/>>.

[**Norvidas, Saulius**]. On harmonic continuation of characteristic functions / S. Norvidas // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 3 (2010), p. 418-425. Prieiga per internetą: <<http://www.springerlink.com/content/866h2163185hw3lj/>>.

[**Plikusas, Aleksandras Ernestas**]; Pumputis, Dalius. Estimation of the finite population covariance using calibration / A. Plikusas, D. Pumputis // Nonlinear analysis: modelling and control. ISSN 1392-5113. Vol. 15, no. 3 (2010), p. 325-340. Prieiga per internetą: <<http://www.lana.lt/journal/38/Plikusas.pdf>>.

[**Račkauskas, Alfredas**]; Suquet, Charles. On limit theorems for Banach-space-valued linear processes / A. Račkauskas and Ch. Suquet // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 1 (2010), p. 71-87. Prieiga per internetą: <<http://www.springerlink.com/content/w3570437952873h7/?p=f89ccd714ddc43048940a556d88532db&pi=5>>.

[**Statulevičienė, Aldona**]. On asymptotics of deficit distribution and its moments at the time of ruin / A. Aleškevičienė // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 1 (2010), p. 1-12. Prieiga per internetą: <<http://www.springerlink.com/content/v8v22631267x436q/?p=f89ccd714ddc43048940a556d88532db&pi=0>>.

## **MATERIALS OF CONFERENCES**

[**Jakimauskas, Gintautas**]; Sakalauskas, Leonidas. Empirical Bayesian estimation for Poisson-gamma model / Gintautas Jakimauskas, Leonidas Sakalauskas // 24th Mini EURO conference on continuous optimization and information-based technologies in the financial sector (MEC EurOPT 2010). Vilnius : Technika, 2010. ISBN 9789955285984. P. 254-257. Prieiga per internetą: <[http://www.vgtu.lt/leidiniai/leidykla/MEC\\_EurOPT\\_2010/008/0002.html](http://www.vgtu.lt/leidiniai/leidykla/MEC_EurOPT_2010/008/0002.html)>.

[**Jakimauskas, Gintautas**]; [**Sušinskas, Jurgis**]. Application of the empirical Bayes approach to nonparametric testing for high-dimensional data / Gintautas Jakimauskas, Jurgis Sušinskas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 402-407. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Statistikos\\_sekcija%28391-430%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Statistikos_sekcija%28391-430%29.pdf)>.

[**Mačys, Juozas Juvencijus**]. 59-oji Lietuvos moksleivių olimpiada / Juozas Juvencijus Mačys // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 127-132. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

[**Mačys, Juozas Juvencijus**]. Galingieji įrodymo metodai / Juozas Juvencijus Mačys // Matematika ir matematikos dėstymas - 2010 : konferencijos pranešimų medžiaga. Kaunas : Technologija, 2010. ISBN 9789955257943. P. 21-25.

[**Mačys, Juozas Juvencijus**]. School-elementary proof of the  $e^n$  irrationality / Juozas Juvencijus Mačys // 2nd international conference "Gifted children: challenges and possibilities" : October 11-16, 2009, Riga, Latvia : proceedings. Kaunas : Technologija, 2010. ISBN 9789955257615. P. 61-64.

[**Mačys, Juozas Juvencijus**]. Svarbiausios konstantos tikimybių teorijoje / Juozas Juvencijus Mačys // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 465-469. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Tikimybiu\\_Teorijos\\_sekcija%28454-479%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Tikimybiu_Teorijos_sekcija%28454-479%29.pdf)>.

[**Mačys, Juozas Juvencijus**]; [**Sušinskas, Jurgis**]. 2010 m. Kengūros konkurso apžvalga / Juozas Juvencijus Mačys, Jurgis Sušinskas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 133-138. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

Murauskas, Gediminas; [**Radavičius, Marijus**]. Studentų pasiekimų analizė naudojant ranginę logistinę regresiją / Gediminas Murauskas, Marijus Radavičius // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 408-413. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Statistikos\\_sekcija%28391-430%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Statistikos_sekcija%28391-430%29.pdf)>.

[**Piaseckienė, Karolina**]; [**Radavičius, Marijus**]; Stiklius, Raimundas. Lietuviškų tekstų stilių palyginimas remiantis universalių kiekybinių charakteristikų statistine analize / Karolina Piaseckienė, Marijus Radavičius, Raimundas Stiklius // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T.

51 (2010), p. 307-312. Prieiga per internetą:

<ftp://ftp.science.mii.lt/pub/publications/51\_TOMAS%282010%29/Matematikos\_Taikymu\_II\_sekcija%28250-335%29.pdf>.

[**Radavičius, Marijus**]. EM algoritmas bendram Gauso modeliui su paslėptaisiais kintamaisiais / Marijus Radavičius // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 420-425. Prieiga per internetą:

<ftp://ftp.science.mii.lt/pub/publications/51\_TOMAS%282010%29/Statistikos\_sekcija%28391-430%29.pdf>.

[**Radavičius, Marijus**]; [**Jakimauskas, Gintautas**]; [**Sušinskas, Jurgis**]. Empirical Bayes testing goodness-of-fit for high-dimensional data / M. Radavičius, G. Jakimauskas, J. Sušinskas // Computer data analysis and modeling : complex stochastic data and systems : proceedings of the Ninth international conference : Minsk, September 7-11, 2010. Vol. 1. Minsk : Publishing center BSU, 2010. ISBN 9789854768472. P. 199-202.

[**Radavičius, Marijus**]; Samusenko, Pavel. Palyginamoji pažangumo analizė: panelinės logistinės regresijos modelis / Marijus Radavičius, Pavel Samusenko // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 373-378. Prieiga per internetą:

<ftp://ftp.science.mii.lt/pub/publications/51\_TOMAS%282010%29/Skaiciavimo\_Matematikos\_sekcija%28362-390%29.pdf>.

[**Radavičius, Marijus**]; Samusenko, Pavel. Profile statistics for sparse contingency tables / M. Radavičius, P. Samusenko // Computer data analysis and modeling : complex stochastic data and systems : proceedings of the Ninth international conference : Minsk, September 7-11, 2010. Vol. 2. Minsk : Publishing center BSU, 2010. ISBN 9789854768489. P. 55-58.

[**Rudzkis, Rimantas**]; Rojaka, Jekaterina. The Baltic states and Poland: economic development peculiarities / Rimantas Rudzkis, Jekaterina Rojaka // Business and management : selected papers. ISSN 2029-4441. [2010], vol. 1 (2010), p. 147-153. Prieiga per internetą:

<http://www.vgtu.lt/leidiniai/leidykla/BUS\_AND\_MANA\_2010/Finance\_Engineering/021.html>.

Sakalauskas, Leonidas; [**Jakimauskas, Gintautas**]; [**Sušinskas, Jurgis**]. Analysis of medical data by empirical bayes method / L. Sakalauskas, G. Jakimauskas, J. Susinskas // Computer data analysis and modeling : complex stochastic data and systems : proceedings of the Ninth international conference : Minsk, September 7-11, 2010. Vol. 1. Minsk : Publishing center BSU, 2010. ISBN 9789854768472. P. 203-206.

[**Sunklodas, Jonas Kazys**]. Some estimates of the normal approximation for mixture of Poisson and gamma random variables / Jonas Kazys Sunklodas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 475-479. Prieiga per internetą:

<ftp://ftp.science.mii.lt/pub/publications/51\_TOMAS%282010%29/Tikimybiu\_Teorijos\_sekcija%28454-479%29.pdf>.

## **COOPERATION**

- Bielefeld university Collaborative Research Centre „Spectral Structures and Topological Methods in Mathematics”.
- Prof. V. Vinogradov, USA;  
Prof. B. Jorgenson, Danmark;  
Prof. L. Klebanov, Check Republik (Prof. O. Januškevičienė).

## **OTHER SCIENTIFIC ACTIVITIES**

**Habil. Dr. V. Bentkus** (till 2010 06 03) –

- Section Editors of Lithuanian Mathematical Journal.

**Prof. O. Januškevičienė** –

- Participation in the organization of the activities of the Baltic-Nordic-Ukrainian network on survey statistics <https://wiki.helsinki.fi/display/BNU/Organisation>

**Doc. D. Krapavickaitė** –

- Editor in Chief of the journal „Lietuvos statistikos darbai 2010“ ,

- Associate editor of the journal „Statistics in Transition“, [http://www.stat.gov.pl/cps/rde/xbcr/pts/SiT\\_11\\_1.pdf](http://www.stat.gov.pl/cps/rde/xbcr/pts/SiT_11_1.pdf)
- Member of the organizing committee of the Workshop on Survey Sampling Theory and Methodology, August 23-27, 2010 Vilnius  
<http://vilniusworkshop2010.stat.gov.lt/Organizers%20and%20sponsors.html>

**Prof. E. Manstavičius –**

- Section Editors of Lithuanian Mathematical Journal.

**Dr. S. Norvidas –**

- Editorial board member of the Lithuanian Mathematical Journal.

**Prof. V. Paulauskas –**

- Section Editors of the Lithuanian Mathematical Journal,
- Section Editors of the Central European Mathematical Journal.

**Prof. R. Rudzkis –**

- Editorial board member of the Lithuanian Mathematical Journal,
- Editorial board member of the journal “Прикладная эконометрика”.
- Editorial board member of the journal „Lietuvos statistikos darbai 2010,
- Editorial board member of the journal “Pinigų studijos”.

## RECOGNITION PROCESSES DEPARTMENT

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**Head** – Prof. Habil. Dr. Laimutis Telksnys

### *STAFF*

**Principal researchers: (1)** KAZLAUSKAS, Kazys.

**Senior researchers: (5)** TELKSNYS, Laimutis; KLIGIENĖ, S. Nerutė; LIPEIKA, Antanas Leonas; PUPEIKIS, Rimantas; LIPEIKIENĖ, Joana.

**Researchers: (4)** OŽERAITIS, Evaldas Robertas; KAUKĖNAS, Jonas; TAMULEVIČIUS, Gintautas; SAULEVIČIUS, Donatas.

**Technical assistants: (4)** LAURINČIUKAITĖ, Sigita; MAKUTĖNAS, Linas; PAJEDIENĖ, Ramutė; ZDANEVIČIUS, Jonas.

**Doctoral students: 8**

GREIBUS, Mindaugas; LILEIKYTĖ, Rasa; RINGELIENĖ, Živilė; KUČIAUSKIENĖ, Gintarė; MAŽEIKA, Robertas; PYŽ, Gražina; PNEWSKI, Vladislav; GRICIUS, Gediminas.

### *RESEARCH INTERESTS*

Random processes recognition.

## **RESEARCH PROJECTS CARRIED OUT IN 2010**

### **Projects Supported by University Budget**

*Recognition System Synthesis for Signals with Complex structure.*

The theory and constructive methods for recognition of short-time specific random elements that may emerge in the background of random sequences are expounded. The results of experimental investigations are presented. Detection extrasystoles in heart rate sequences is investigated. Decision making is based on short-term specific random elements in random sequences recognition theory. Three types of extrasystoles are detected: extrasystoles with a noncompensatory post-extrasystolic pause, extrasystoles with a compensatory post-extrasystolic pause, and interpolated extrasystoles. The decision opens the possibility to develop wearable, green – energy saving equipment for long term heart rate variability monitoring of freely moving people.

Recognition of isolated words supported by optimized formante features is investigated.

*Investigations and applications of the dynamical system identification and control algorithms*

An efficient method for computation of the characteristics of the multivariate systems has been proposed, and the analysis of the modern power spectrum estimation methods has been performed.

The robust approach and its technique for parametric identification and control of the closed-loop adaptive system with time-varying parameters has been proposed.

### **International Science Programmes and Projects**

ADHER project supported by European Union in Lifelong Learning program GRUNDTVIG Mobility Partnership, duration 2009-2011.

ADHER (Adopt Your Heritage), Agreement Nr LLP-GRU-MP-2009-LT-00008, project coordinated by ATAKUM Halk Egitim Merkezi ve Aksam Sanat Okulu, Turkey. Partners in Lithuania, Italy, Slovenia, Romania, Greece.

*(under preparation)*

## **MAIN PUBLICATIONS**

### **ARTICLES**

Čeidaitė, G.; [Telksnys, Adolfas Laimutis]. Analysis of factors influencing accuracy of speech recognition / G. Čeidaitė, L. Telksnys // Elektronika ir elektrotechnika. ISSN 1392-1215. 2010, Nr. 9 (105), p. 69-72. Prieiga per internetą: <[http://www.ktu.lt/lt/mokslas/zurnalai/elektros\\_z/z105/15\\_\\_ISSN\\_1392-1215\\_Analysis%20of%20Factors%20Influencing%20Accuracy%20of%20Speech%20Recognition.pdf](http://www.ktu.lt/lt/mokslas/zurnalai/elektros_z/z105/15__ISSN_1392-1215_Analysis%20of%20Factors%20Influencing%20Accuracy%20of%20Speech%20Recognition.pdf)>.

[Kazlauskas, Kazys]. Efficient computation of the multivariate system characteristics / Kazys Kazlauskas // Information technology and control. ISSN 1392-124X. Vol. 39, no. 2 (2010), p. 116-122. Prieiga per internetą: <<http://itc.ktu.lt/itc392/Kazla392.pdf>>.

[Lipeika, Antanas Leonas]. Optimization of formant feature based speech recognition / Antanas Lipeika // Informatica. ISSN 0868-4952. Vol. 21, no. 3 (2010), p. 361-374. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO799.htm>>.



[**Pupeikis, Rimantas**]. On a time-varying parameter adaptive self-organizing system in the presence of large outliers in observations / Rimantas Pupeikis // Informatica. ISSN 0868-4952. Vol. 21, no. 1 (2010), p. 79-94. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO783.htm>>.

[**Tamulevičius, Gintautas**]; Arminas, V.; Ivanovas, E.; Navakauskas, Dalius. Hardware accelerated FPGA implementation of Lithuanian isolated word recognition system / G. Tamulevičius ... [et al.] // Elektronika ir elektrotechnika. ISSN 1392-1215. 2010, Nr. 3 (99), p. 57-62. Prieiga per internetą: <[http://www.ktu.lt/lt/mokslas/zurnalai/elektros\\_z/z99/13\\_\\_ISSN\\_1392-1215\\_Hardware%20Accelerated%20FPGA%20Implementation%20of%20Lithuanian%20Isolated%20Word%20Recognition%20System.pdf](http://www.ktu.lt/lt/mokslas/zurnalai/elektros_z/z99/13__ISSN_1392-1215_Hardware%20Accelerated%20FPGA%20Implementation%20of%20Lithuanian%20Isolated%20Word%20Recognition%20System.pdf)>.

Žutautaitė-Šeputienė, Inga; Augutis, Juozas; [**Telksnys, Adolfas Laimutis**]. Parameters estimation in modelling of gas-gap in RBMK type reactor using Bayesian approach / Inga Žutautaitė-Šeputienė, Juozas Augutis, Laimutis Telksnys // Informatica. ISSN 0868-4952. Vol. 21, no. 2 (2010), p. 295-306. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO786.htm>>.

## **MATERIALS OF CONFERENCES**

Arminas, Vytautas; [**Tamulevičius, Gintautas**]; Navakauskas, Dalius; Ivanovas, Edgaras. Acceleration of feature extraction for FPGA-based speech recognition / Vytautas Arminas ... [et al.] // Proceedings of SPIE. ISSN 0277-786X. Vol. 7745 (2010), p. 774511-1-6.

Dzemydienė, Dalė; Bielskis, Antanas Andrius; Andziulis, Arūnas; Drungilas, Darius; Dzindzalieta, Ramūnas; [**Gricius, Gediminas**]. The reinforcement framework of a decision support system for the localization and monitoring of intelligent remote bio robots / Dale Dzemydiene ... [et al.] // Proceedings of the 10th international conference "Reliability and statistics in transportation and communication" (RelStat'10) : 20-23 October 2010, Riga, Latvia. Riga : Transport and Telecommunication Institute, 2010. ISBN 9789984818344. P. 207-217.

[**Lipeikienė, Joana**]. Konektyvizmas mokymo praktikoje: atvejo analizė / Joana Lipeikienė // Mokymosi bendruomenė ir antrosios kartos saityno (Web 2.0) technologijos : tarptautinės konferencijos pranešimai. Vilnius : Matematikos ir informatikos institutas, 2010. ISBN 9789986680482. P. 55-60. Prieiga per internetą: <<http://ims.mii.lt/Web20Mokymui/mokymosi-bendruomene.pdf#view=FitH,100>>.

Navakauskas, Dalius; [**Tamulevičius, Gintautas**]; Arminas, Vytautas; Ivanovas, Edgaras; Martavičius, Romanas. Efficiency of initial FPGA implementation of Lithuanian isolated word recognition system / Dalius Navakauskas ... [et al.] // 33th international conference on fundamentals of electrotechnics and circuit theory IC-SPETO 2010 : Gliwice - Ustroń, 26-29.05.2010. Gliwice : Silesian University of Technology, 2010. ISBN 9788385940326. P. 79-80.

[**Petreikytė, Gintarė**]; [**Kazlauskas, Kazys**]. Spektro įvertinimo algoritmų palyginamoji analizė / Gintarė Petreikytė, Kazys Kazlauskas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 301-306. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_Taikymu\\_II\\_sekcija%28250-335%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_Taikymu_II_sekcija%28250-335%29.pdf)>.

[**Ringelienė, Živilė**]; [**Lipeika, Antanas Leonas**]. Development of the hidden Markov models based Lithuanian speech recognition system / Z. Ringeliene and A. Lipeika // Proceedings of SPIE. ISSN 0277-786X. Vol. 7745 (2010), p. 774512-1-6.

## **COOPERATION**

Home Rehab. Integrated services for supporting home-based post-disease rehabilitation and patient monitoring, Subsystem HearVI. Heart – Rate Variability Informer – subitem of HomeRehab system for Integrated services for supporting home – based post-disease rehabilitation and patient monitoring

University of Bremen, Germany  
InfoConsult GmbH, Germany  
University of Genoa – DIBE, Italy  
Fondazione Don Gnocchi Onlus, Italy  
Siemens AG, Germany  
Vamed AG, Austria

Fraunhofer Gesellschaft zur Forderung der angewandten Forschung e.V., Germany  
Vilnius Universitetas, Lithuania  
Riga Technical University, Latvia  
Imaginary S.r.l. Italy  
Softeco, Italy  
Edna Pasher & Associates, Israel  
Centro Poliklinika, Vilnius, Lithuania  
Kaunas University of Technology, Lithuania  
Lithuanian University of Health Sciences, Lithuania

### ***OTHER SCIENTIFIC ACTIVITIES***

TERENA (trans - European Research and Education Networking Association Networking Conference 2010 (TNC 2010). 2010-05-31 – 2010-06-03.  
Local Host.

16th International Conference on Information and Software Technologies, April 21-23, Kaunas, Lithuania. Program Committee member.

IFIP – International Federation Information Processing. Scientific Journal Informatica, Information Technology and Control, Electronics and Electrotechnics, Tamkang Journal of Sciences, and Engineering. Redaction member ship.

### **SOFTWARE ENGINEERING DEPARTMENT**

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**Head** – Prof. Dr. *Albertas Čaplinskas*

### ***STAFF***

**Principal researchers:** Prof. Dr. A. Čaplinskas, Prof. Dr. D. Dzemydienė (part-time), Prof. Dr. R. Baronas (part-time, till 31 August 2010)

**Senior researchers:** Doc. Dr. A. Lupeikienė.

**Researchers:** Dr. J. D. Besson (part-time), Dr. S. Maskeliūnas, Dr. V. Paliulionis.

**Junior researchers:** L. Paliulionienė (till 30 April 2010).

**Assistant researchers:** L. Paliulionienė (from 30 April 2010).

**Technical assistants:** J. Miliauskaitė (part-time), D. Burokienė (till 31 August 2010), S. Žilionytė (till 31 August 2010)

**Doctoral students:** L. Bagušytė (till 30 September 2010), D. Drungilas, R. Dzindzalieta, G. Gričius, M. Kaziliūnas, J. Miliauskaitė, S. Svanidzaitė, M. Šaučiūnas, Ž. Vaira.

### ***RESEARCH INTERESTS***

Software engineering  
Information system engineering  
Software service engineering

## **RESEARCH PROJECTS CARRIED OUT IN 2010**

### **Projects Supported by University Budget**

**Service-oriented systems engineering problems.** Prof. Dr. A. Čaplinskas (leader), L. Bagušytė, Prof. Dr. R. Baronas, D. Burokienė, Dr. J. D. Besson, D. Drungilas, Prof. D. Dzemydienė, R. Dzindzalieta, Doc. Dr. A. Lupeikienė, Dr. S. Maskeliūnas, L. Paliulionienė, Dr. V. Paliulionis, M. Šaučiūnas, Ž. Vaira, S. Žilionytė. 2009-2011.

Main results obtained in 2010: Application of CLP methods for the digital optimization of QoS-aware semantic-annotated service compositions; a conceptual scheme of automatic service negotiation process; recommendations how to apply methods of the design of distributed embedded systems for the design of sensor-based service-oriented eEnvironments; architectural patterns for networked enterprise systems; a method of geocoding with inaccurate Lithuanian postal addresses; analysis of legal text processing methods.

### **Projects, Programmes, Issues Supported by Lithuanian State Science and Studies Foundation**

**Grant No. TAP-43/2010** to fund project **Application of data mining methods for investigation of software systems** (V-33/2010), TAP-43/2010 of the bilateral Lithuanian-France research program **Gilibert**, in collaboration with INSA de Lyon, LIRIS UMR 5205, France. Dr. J. D. Besson (leader), Prof. Dr. A. Čaplinskas, Doc. Dr. A. Lupeikienė. 2009-2010.

### **Ordered Research Projects**

**Innovation Cheque No. 31V-80** (trilateral agreement between IMI, Fresh ID LLC and Agency for Science, Innovation and Technology). Prof. Dr. A. Čaplinskas, Doc. Dr. A. Lupeikienė, L. Paliulionienė. 2010.

### **International Science Programmes and Projects**

Bilateral Lithuanian-France research program **Gilibert**, project **Application of data mining methods for investigation of software systems** (V-33/2010). Dr. J. D. Besson (leader), Prof. Dr. A. Čaplinskas, Doc. Dr. A. Lupeikienė. 2009-2010.

## **MAIN PUBLICATIONS**

### **ARTICLES**

[Besson, Jeremy]; [Čaplinskas, Albertas]. QOS-Aware Composition of Enterprise System's Components: Constraint Logic Programming Approach / Jeremy Besson, Albertas Čaplinskas // Informatica. ISSN 0868-4952. Vol. 21, no. 4 (2010), p. 487-504. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO804.htm>>.

[Dzemydienė, Dalė]; Bielskis, Antanas Andrius, Andziulis, Arūnas; [Drungilas, Darius]; Gricius, Gediminas. Recognition of Human Emotions in Reasoning Algorithms of Wheelchair Type Robots / Dalė Dzemydienė .... [et al.] // Informatica. ISSN 0868-4952. Vol. 21, no. 4 (2010), p. 521-532. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO808.htm>>.

### **MATERIALS OF CONFERENCES**

Ašeris, Vytautas; [Baronas, Romas]. Using grid computing to model biosensors acting in stirred and non-stirred solutions V. Ašeris, R. Baronas // Fifth European conference on computational fluid dynamics, ECCOMAS CFD 2010 [Elektroninis išteklius] : June 14-17, 2010, Lisbon, Portugal : proceedings. Lisbon : Instituto Superior Tecnico, 2010. ISBN 9789899677814. P. 1-13.

Besson, Jérémy; Mitašiūnaitė, Ieva; [Lupeikienė, Audronė]; Boulicaut, Jean-François. Comparing intended and real usage in web portal: temporal logic and data mining / Jérémy Besson ... [et al.] // Business information systems : 13th international conference, BIS 2010 : Berlin, Germany, May 3-5, 2010 : proceedings. Berlin ; Heidelberg : Springer, 2010. ISBN 9783642128134. P. 83-93. Prieiga per internetą: <<http://www.springerlink.com/content/uu87174374547u8p/>>.

Dzemydienė, Dalė; Bielskis, Antanas Andrius; Andziulis, Arūnas; [Drungilas, Darius]; [Dzindzalieta, Ramūnas]. Sensorinių tinklų taikymo pavyzdžiai intelektualiai aplinkai kurti belaidžių technologijų priemonėmis / D. Dzemydienė ... [et al.] // Technologijos mokslo darbai Vakarų Lietuvoje. ISSN 1822-4652. [T.] 7 (2010), p. 160-164.

Dzemydienė, Dalė; Bielskis, Antanas Andrius; Andziulis, Arūnas; [Drungilas, Darius]; [Dzindzalieta, Ramūnas]; Gričius, Gediminas. The reinforcement framework of a decision support system for the localization and monitoring of intelligent remote bio robots / Dale Dzemydiene ... [et al.] // Proceedings of the 10th international conference "Reliability and statistics in transportation and communication" (RelStat'10) : 20-23 October 2010, Riga, Latvia. Riga : Transport and Telecommunication Institute, 2010. ISBN 9789984818344. P. 207-217.

Dzemydienė, Dalė; [Dzindzalieta, Ramūnas]. Development of architecture of embedded decision support systems for risk evaluation of transportation of dangerous goods / Dalė Dzemydienė, Ramūnas Dzindzalieta // Technological and economic development of economy. ISSN 1392-8619. Vol. 16, no. 4 (2010), p. 654-671. Prieiga per internetą: <<http://www.tede.vgtu.lt/lt/3/NR/PUB/29356>>.

[Drungilas, Darius]; Bielskis, Antanas Andrius; Denisov, Vitalij; [Dzemydienė, Dalė]. Data mining approaches for intelligent e-social care decision support system / Darius Drungilas ... [et al.] // Artificial intelligence and soft computing : 10th international conference, ICAISC 2010 : Zakopane, Poland, June 13-17, 2010. Part 1. ISBN 9783642132070. Berlin ; Heidelberg : Springer, 2010, P. 605-612. Prieiga per internetą: <<http://www.springerlink.com/content/lw45852251558101/>>.

Otas, Alfredas; [Maskeliūnas, Saulius]. Development of computer literacy in Lithuania / Alfredas Otas, Saulius Maskeliūnas // ICT skills, education and certification: the multi-stakeholder partnership : proceedings of the 4th IT STAR workshop on ICT skills, education and certification: the multi-stakeholder partnership : 27-28 November 2009, Rome, Italy. Milan : AICA ; Baden (Austria) : Plamen Nedkov, 2010. ISBN 8890162058. P. 61-68.

### ***COOPERATION in the organization of conferences:***

Kaunas University of Technology (Lithuania)

University of Latvia (Latvia)

Riga Technical University (Latvia)

Tallinn University of Technology (Estonia)

INSA de Lyon (France)

Slovak University of Technology in Bratislava (Slovakia)

University of Maribor (Slovenia)

University of Vienna (Austria)

Institute for Problems of Informatics of the Russian Academy of Science (Russia)

Institute for System Programming of the Russian Academy of Science (Russia)

University of St.-Petersburg (Russia)

Harles University (Czech Republic)

Technical University of Varna (Bulgaria)

Poznan University of Technology (Poland)

Università Roma Tre (Italy)

Tampere University of Technology (Finland)

University of Novi Sad (Serbia)

Aristotle University (Greece)

Yerevan State University (Armenia)

National Taras Shevchenko University of Kyiv (Ukraine)  
Christian-Albrechts-University Kiel (Germany)  
University of Tsukuba (Japan)

### ***OTHER SCIENTIFIC ACTIVITIES***

#### **Prof. Dr. A. Čaplinskas**

- editorial board member of the journal *Informatica*,  
<http://www.mii.lt/informatica/editors.htm>;
- editorial board member of the journal *Computer Science and Information Technologies (Scientific papers university of Latvia)*,  
<http://www.lu.lv/materiali/apgads/raksti/756.pdf>;
- editorial board member of the *Scientific Journal of Riga Technical University. Computer Sciences*, <http://versita.com/sjrtucs/editors/>;
- steering committee and program committee member of the annual East European Conference on Advances in Databases and Information Systems (ADBIS),  
<http://www.adbis2010.org/>;
- program committee member of the 14th East European Conference on Advances in Databases and Information Systems (ADBIS), Novi Sad, Serbia, September 20 - 24, 2010, <http://www.adbis2010.org/>;
- program committee member of the 9th Conference on Databases and Information Systems (BalticDB&IS 2010), Riga, Latvia, July 5-7, 2010,  
<http://www.lumii.lv/dbis2010/page.php?page=organization>;
- program committee member of the 6th Central and Eastern European Software Engineering Conference in Russia, Moscow, Russia, October 13-15, 2010,  
<http://2010.cee-secr.org/lang/en-en/submission/committees/>;
- program committee member of the International Workshop on Real Time Software (RTS'10), Wisla, Poland, October 18-20, 2010,  
<http://www.imcsit.org/md/cmt/&sub=340&pars=12>;
- program committee member of the 19th International Conference on Information Systems Development (ISD 2010), Prague, Czech Republic, August 25 - 27, 2010,  
<http://www.ksi.mff.cuni.cz/isd2010/committee.php>;
- program committee member of the 16th International Conference on Information and Software Technologies (IT 2010), Kaunas, Lithuania, April 21-23, 2010,  
<http://isd.ktu.lt/it2010/>;
- reviewer for the 5th International Computer Science Symposium in Russia (CSR 2010), Kazan, Russia, June 16-20, 2010, <http://csr2010.antat.ru/CallForPapers.html>;
- program committee co-chair of the 9th Joint Conference on Knowledge-Based Software Engineering (JCKBSE'10), Kaunas, Lithuania, August 25-27, 2010,  
<http://www.mii.lt/jckbse10/index.php?q=conference-organisation>;
- program committee member of the 2nd International Workshop on Data Mining Methods for Software Systems, Druskininkai, Lithuania, December 2-4, 2010,  
[http://www.liks.lt/uploads/LIKS-MII\\_Drusk\\_2010.pdf](http://www.liks.lt/uploads/LIKS-MII_Drusk_2010.pdf).

- nominated expert of the National Committee of the Information and Communication Technology Programme (FP7-ICT) of the 7th Research Framework Programme (FP7) (till 1 March 2010);

#### **Prof. Dr. R. Baronas**

- program committee member of the 9th Joint Conference on Knowledge-Based Software Engineering (JCKBSE'10), Kaunas, Lithuania, August 25-27, 2010, <http://www.mii.lt/jckbse10/index.php?q=conference-organisation>;
- editorial board member of the journal *Nonlinear Analysis: Modelling and Control*, <http://www.lana.lt/journal>;
- editorial board member of the *Open Information Systems Journal*, <http://www.bentham.org/open/toisj/EBM.htm>;
- editorial board member of the *Open Structural Biology Journal*, <http://www.bentham.org/open/tosbj/EBM.htm>;
- editorial board member of the *International Journal of Artificial Intelligence*, <http://www.ceser.res.in/isder/ijai/eb-ijai.html>;
- expert of the Research Council of Lithuania;
- expert of the Lithuanian State Science and Studies Foundation;
- expert of the Agency for International Science and Technology Development Programmes in Lithuania;
- expert of the Lithuanian Centre for Quality Assessment in Higher Education;
- expert of the Slovak Research and Development Agency.

#### **Prof. Dr. D. Dzemydienė**

- editorial board member of the *Scientific Journal of Riga Technical University. Computer Sciences*, <http://versita.com/sjrtucs/editors/>;
- editorial board member of the journal *Technological and Economical Development of Economy*, [http://www.tede.vgtu.lt/en/?page=2&sub=RED\\_KOLEGIJA](http://www.tede.vgtu.lt/en/?page=2&sub=RED_KOLEGIJA);
- editorial board member of the *International Journal of Electronic Security and Digital Forensics (IJESDF)*, <http://www.inderscience.com/browse/index.php?journalID=217#board>;
- Deputy Editor-in-Chief of the international scientific research journal of Mykolas Romeris University *Intellectual Economics*, [http://www3.mruni.eu/~int.economics/redkolegija\\_en.html](http://www3.mruni.eu/~int.economics/redkolegija_en.html);
- program committee member of the 9th Conference on Databases and Information Systems (BalticDB&IS 2010), Riga, Latvia, July 5-7, 2010, <http://www.lumii.lv/dbis2010/page.php?page=organization>;
- program committee member of the 9th Joint Conference on Knowledge-Based Software Engineering (JCKBSE'10), Kaunas, Lithuania, August 25-27, 2010, <http://www.mii.lt/jckbse10/index.php?q=conference-organisation>.

#### **Doc. Dr. A. Lupeikienė**

- editorial board member of the journal *Informatica*, <http://www.mii.lt/informatica/editors.htm>;
- editorial board member of the *Scientific Journal of Riga Technical University. Computer Sciences*, <http://versita.com/sjrtucs/editors/>.
- program committee member of the 9th Joint Conference on Knowledge-Based Software Engineering (JCKBSE'10), Kaunas, Lithuania, August 25-27, 2010, <http://www.mii.lt/jckbse10/index.php?q=conference-organisation>.

**Dr. S. Maskeliūnas**

- program committee member of the 9th Conference on Databases and Information Systems (BalticDB&IS 2010), Riga, Latvia, July 5-7, 2010, <http://www.lumii.lv/dbis2010/page.php?page=organization>;
- program committee member of the 9th Joint Conference on Knowledge-Based Software Engineering (JCKBSE'10), Kaunas, Lithuania, August 25-27, 2010, <http://www.mii.lt/jckbse10/index.php?q=conference-organisation>.
- program committee member of the 5th International Conference on Neural Network and Artificial Intelligence (ICNNAI'2010), Brest, Belarus, 1 - 4 June, 2010 <http://icnnai.bstu.by/call-for-participation.html>

**Dr. V. Paliulionis**

- reviewer for the journal *Informatica*, <http://www.mii.lt/informatica/>.

**MATHEMATICAL LOGIC SECTOR  
of the SOFTWARE ENGINEERING DEPARTMENT**

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**Head** – Assoc. Prof. Habil. Dr. Regimantas Ričardas Pliuškevičius

**STAFF**

**Principal researchers:** Prof. Habil. Dr. S. Jukna (associated researcher)

**Senior researchers:** Assoc. Prof. Habil. Dr. R. Pliuškevičius, Dr. R. Alonderis, Assoc. Prof. Dr. J. Sakalauskaitė.

**Doctoral students:** H. Giedra, A. Girčys

**RESEARCH INTERESTS**

Proof theory of non-classical logics

Automated deduction

Decision procedures

Boolean function complexity

Lower bounds

## **RESEARCH PROJECTS CARRIED OUT IN 2010**

### **Projects Supported by University Budget**

**Efficient proof methods for logics of knowledge; graphic structure and complexity of logic functions.** Assoc. Prof. Habil. Dr. R. Pliuškevičius, 2009-2011.

The scientific research were realized in two areas: (1) automated reasoning in logic of knowledge and (2) complexity of Boolean function .

In the first area, two problems has been investigated: (a) elimination of searching of periodicity and (b) specialization of backtracking in process of derivation. In the point (a) a new method to determine termination of derivation and to eliminate loop check for transitive and reflexive modal logics was presented. In the point (b) effective strategies allowing to restrict backtracking in derivatios were described.

In the second area, an optimal lower bound of  $n^3$  on the number of wires in a depth-2 circuit computing the product of two  $n$ -by- $n$  Boolean matrices over  $GF(2)$  was obtained. It was also shown that linear operators can be computed much more efficiently using non-linear gates. Finally, it was shown that the classical Khrapchenko's lower bound on the formula size cannot be improved using convex complexity measures.

### **Ordered Research Projects**

**Deutsche Forschungsgemeinschaft (DFG) grant SCHN 503/5-1: Limits of algorithmic paradigms.** Prof. S. Jukna, 2010-1013.

## **MAIN PUBLICATIONS**

### **ARTICLES**

Hrubeš, Pavel; [Jukna, Stasys]; Kulikov, Alexander; Pudlák, Pavel. On convex complexity measures / P. Hrubeš ... [et al.] // Theoretical computer science. ISSN 0304-3975. Vol. 411, iss. 16-18 (2010), p. 1842-1854. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.tcs.2010.02.004>>.

[Jukna, Stasys]. Entropy of operators or why matrix multiplication is hard for depth-two circuits / Stasys Jukna // Theory of computing systems. ISSN 1432-4350. Vol. 46, no. 2 (2010), p. 301-310. Prieiga per internetą: <<http://www.springerlink.com/content/r048k436r53024v4/?p=7ae355410baa449594ef88f88478aca1&pi=7>>.

[Jukna, Stasys]. Representing (0, 1)-matrices by boolean circuits / Stasys Jukna // Discrete mathematics. ISSN 0012-365X. Vol. 310, iss. 1 (2010), p. 184-187. Prieiga per internetą: <<http://dx.doi.org/10.1016/j.disc.2009.07.011>>.

[Pliuškevičius, Regimantas]; [Pliuškevičienė, Aida]. A new method to obtain termination in backward proof search for modal logic S4 / Regimantas Pliuskevicius and Aida Pliuskeviciene // Journal of logic and computation. ISSN 0955-792X. Vol. 20, iss. 1 (2010), p. 353-379. Prieiga per internetą: <<http://dx.doi.org/10.1093/logcom/exn071>>.

[Pliuškevičius, Regimantas]; [Pliuškevičienė, Aida]. A new method to obtain termination in backward proof search for modal logic S4 / Regimantas Pliuskevicius and Aida Pliuskeviciene // Journal of logic and computation. ISSN 0955-792X. Vol. 20, iss. 1 (2010), p. 381-387. Prieiga per internetą: <<http://dx.doi.org/10.1093/logcom/exp051>>.

### **MATERIALS OF CONFERENCES**

[Giedra, Haroldas]. Cut free sequent calculus for logic S5<sub>n</sub>(ED) / Haroldas Giedra // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 336-341. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematines\\_Logikos\\_sekcija%28336-351%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematines_Logikos_sekcija%28336-351%29.pdf)>.

[Sakalauskaitė, Jūratė]. Partial cut elimination for propositional discrete linear time temporal logic / Jūratė Sakalauskaitė // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51



(2010), p. 347-351. Prieiga per internetą:  
<[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematines\\_Logikos\\_sekcija%28336-351%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematines_Logikos_sekcija%28336-351%29.pdf)>.

## **COOPERATION**

University of Frankfurt

St.Petersburg Scientific Center of Russian Academy of Science (Russia)

Faculty of Mathematics and Informatics (Vilnius University)

Kaunas University of Technology (Lithuania)

## **OTHER SCIENTIFIC ACTIVITIES**

**Prof. Habil. Dr. S. Jukna** –

- scientific board member of ECCC, Electronic Colloquium on Computational Complexity; <http://eccc.hpi-web.de/>
- editorial board member of the Lithuanian Mathematical Journal; [http://www.mii.lt/index.php?siteaction=pages.ed&page=lmj\\_an&lang=en](http://www.mii.lt/index.php?siteaction=pages.ed&page=lmj_an&lang=en).
- member of the program committee of the CSR 2010, 5th International Computer Science Symposium in Russia, CSR 2010, Kazan, Russia, June 16-20, 2010. <http://csr2010.antat.ru/Committees.html>

**Assoc. Prof. Habil. Dr. R. Pliuškevičius** –

- editorial board member of the Lithuanian Mathematical Journal; [http://www.mii.lt/index.php?siteaction=pages.ed&page=lmj\\_an&lang=en](http://www.mii.lt/index.php?siteaction=pages.ed&page=lmj_an&lang=en).
- member of the American Mathematical Society, <http://www.ams.org>;
- reviewer of Mathematical Reviews (USA).
- reviewer of Computing Reviews (USA).

## **STOCHASTIC PROCESSES DEPARTMENT**

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**Principal researchers:** Prof. Dr Liudas Giraitis (associated scientist)

Prof. Habil. Dr Bronius Grigelionis

Prof. Habil. Dr Kęstutis Kubilius

Prof. Habil. Dr Remigijus Leipus

Prof. Dr Remigijus Mikulevičius (associated scientist)

Prof. Habil. Dr Rimas Norvaiša

Prof. Habil. Dr Alfredas Račkauskas

Prof. Habil. Dr Henrikas Pragarauskas

**Senior researchers:** Dr Arvydas Astrauskas

Dr Martynas Manstavičius

Dr Marijus Vaičiulis

**Researcher:** Dr Remigijus Petras Gylys

**Technical assistant:** Jurgita Zinkevičienė

**Doctoral student:** Andrej Jedik

**RESEARCH INTERESTS** inference for long memory processes, modeling financial data, long range dependence, heavy tails, aggregation, self-similar processes, Levy processes, rough paths, concrete functional calculus, stochastic partial differential equations, random Hamiltonians, MV-algebras .

### **RESEARCH PROJECTS CARRIED OUT IN 2010**

#### **Projects Supported by University Budget**

1. Stochastic Equations for Random Processes and Fields. Prof. B. Grigelionis, prof. H. Pragarauskas. 2008-2010.

For solutions of stochastic differential equations driven by fractional Brownian motion, asymptotic properties and consistency rates of the Gladyshev estimate of the Hurst index were obtained. Necessary and sufficient conditions of self-decomposability of the Hougaard subordinated Gauss-Levy processes were found and related Ornstein-Uhlenbeck processes were described.

2. Modeling of financial returns and statistical inferences. Prof. D. Surgailis. 2008-2010.

Contemporaneous aggregation of the LARCH model was studied. It was proved that the squared aggregated process exhibits long memory and their partial sums converge to a self-similar process of a new type. A two-sample test for comparison of long memory parameters based on ratios of two rescaled variance statistics was constructed. The two samples have the same length and can be mutually independent or dependent. In the latter case, the test statistic is modified to make it asymptotically free of the long-run correlation coefficient between the samples.

#### **Projects, Programmes, Issues Supported by Lithuanian State Science and Studies Foundation**

Project: Calculus of rough functions and applications in econometrics. Prof. R. Norvaiša, 2010-2011.

Project: The monograph „Large Sample Inference for Long Memory Processes“. Authors: L. Giraitis, H.L. Koul and D. Surgailis. 2009-2010.

### **MAIN PUBLICATIONS**

#### **MONOGRAPH**

Dudley, Richard M.; [Norvaiša, Rimas]. Concrete functional calculus / R. M. Dudley, R. Norvaiša. New York [etc.] : Springer, 2010. 671 p. (Springer monographs in mathematics,, 1439-7382). ISBN 9781441969491.

#### **ARTICLES**

Ambrazevičius, A.; Ivanauskas, Feliksas; [Pragarauskas, Henrikas]. On Duffing equation with random perturbations / A. Ambrazevičius, F. Ivanauskas, H. Pragarauskas // Nonlinear analysis: modelling and control. ISSN 1392-5113. Vol. 15, no. 2 (2010), p. 129-138. Prieiga per internetą: <<http://www.lana.lt/journal/37/Ambrazevicius.pdf>>.

- [**Dubickas, Artūras**]. Powers of rational numbers modulo 1 lying in short intervals / Artūras Dubickas // Results in mathematics. ISSN 1422-6383. Vol. 57, iss. 1-2 (2010), p. 23-31. Prieiga per internetą: <<http://www.springerlink.com/content/3765u26886011370/>>.
- [**Dubickas, Artūras**]; Xu, Zhiqiang. Refinement equations and spline functions / Artūras Dubickas, Zhiqiang Xu // Advances in computational mathematics. ISSN 1019-7168. Vol. 32, no. 1 (2010), p. 1-23. Prieiga per internetą: <<http://www.springerlink.com/content/r7636421256x0261/fulltext.pdf>>.
- Giraitis, Liudas; [**Leipus, Remigijus**]; [**Surgailis, Donatas**]. Aggregation of the random coefficient GLARCH(1,1) process / Liudas Giraitis, Remigijus Leipus and Donatas Surgailis // Econometric theory. ISSN 0266-4666. Vol. 26, iss. 2 (2010), p. 406-425. Prieiga per internetą: <<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=7305504>>.
- [**Gylys, Remigijus Petras**]. Effectible residuated lattices and n-th roots / Remigijus Petras Gylys // Fuzzy sets and systems. ISSN 0165-0114. Vol. 161, iss. 12 (2010), p. 1676-1698. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.fss.2009.12.009>>.
- Yang, Yang; [**Leipus, Remigijus**]; Šiaulys, Jonas. Local precise large deviations for sums of random variables with O-regularly varying densities / Yang Yang, Remigijus Leipus and Jonas Šiaulys // Statistics & probability letters. ISSN 0167-7152. Vol. 80, iss. 19-20 (2010), p. 1559-1567. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.spl.2010.06.011>>.
- Koul, Hira L.; [**Surgailis, Donatas**]. Goodness-of-fit testing under long memory / Hira L. Koula and Donatas Surgailis // Journal of statistical planning and inference. ISSN 0378-3758. Vol. 140, iss. 12 (2010), p. 3742-3753. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.jspi.2010.04.039>>.
- [**Kubilius, Kęstutis**]; Melichov, D. On the convergence rates of Gladyshev's Hurst index estimator / K. Kubilius, D. Melichov // Nonlinear analysis: modelling and control. ISSN 1392-5113. Vol. 15, no. 4 (2010), p. 445-450. Prieiga per internetą: <<http://www.lana.lt/journal/39/Kubilius.pdf>>.
- [**Kubilius, Kęstutis**]; Melichov, D. Quadratic variations and estimation of the hurst index of the solution of SDE driven by a fractional Brownian motion / K. Kubilius and D. Melichov // Lithuanian mathematical journal. ISSN 0363-1672. Vol. 50, no. 3 (2010), p. 401-417. Prieiga per internetą: <<http://www.springerlink.com/content/e666754m78056458/>>.
- Lavancier, Frédéric; Philippe, Anne; [**Surgailis, Donatas**]. A two-sample test for comparison of long memory parameters / Frédéric Lavancier, Anne Philippe and Donatas Surgailis // Journal of multivariate analysis. ISSN 0047-259X. Vol. 101, iss. 9 (2010), p. 2118-2136. Prieiga per internetą: <<http://dx.doi.org/doi:10.1016/j.jmva.2010.04.003>>.
- Puplinskaitė, Donata; [**Surgailis, Donatas**]. Aggregation of a random-coefficient AR(1) process with infinite variance and idiosyncratic innovations / Donata Puplinskaitė and Donatas Surgailis // Advances in applied probability. ISSN 0001-8678. Vol. 42, iss. 2 (2010), p. 509-527. Prieiga per internetą: <[http://projecteuclid.org/DPubS?service=UI&version=1.0&verb=Display&handle=euclid.aap/1275055240\\$\\$http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=8&hid=108&sid=908e680a-ec79-4564-b793-4b4a5625f3bb%40sessionmgr111](http://projecteuclid.org/DPubS?service=UI&version=1.0&verb=Display&handle=euclid.aap/1275055240$$http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=8&hid=108&sid=908e680a-ec79-4564-b793-4b4a5625f3bb%40sessionmgr111)>.
- Rolla, L.T.; Sidoravicius, V.; [**Surgailis, Donatas**]; Vares, M.E.. The discrete and continuum broken line process / L. T. Rolla ... [et al.] // Markov processes and related fields. ISSN 1024-2953. Vol. 16, no. 1 (2010), p. 79-116.

## **COOPERATION**

Massachusetts Institute of Technology (USA)

Michigan State University (USA)

Universite Paris 1 Sorbonne (France)

Universite de Nantes (France)

Universite de Cergy (France)

London University (United Kingdom)

VU Matematikos ir informatikos fakultetas

Vilniaus Gedimino Technikos Universitetas

## ***OTHER SCIENTIFIC ACTIVITIES***

Prof R. Norvaiša:

- Member of the program committee of the 10th International Vilnius Conference on Probability Theory and Mathematical Statistics <http://www.vilniusconference10.com>

Prof R. Leipus:

- Vice-chairman of the organizing committee of the 10th International Vilnius Conference on Probability Theory and Mathematical Statistics <http://www.vilniusconference10.com>
- Associate editor of the *Lithuanian Mathematical Journal*

Prof. K. Kubilius:

- member of the organizing committee of the 10th International Vilnius Conference on Probability Theory and Mathematical Statistics <http://www.vilniusconference10.com>
- Executive editor of the *Lithuanian Mathematical Journal*
- Member of the editorial board of *Mathematical Modelling and Analysis*
- Member of the editorial board of *Proceedings of Institute of Mathematics* (Latvia)

## **SYSTEMS ANALYSIS DEPARTMENT**

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### ***STAFF***

**Chief research staff members:** prof. habil. dr. G. Dzemyda, prof. habil. dr. M. Bloznelis, prof. habil. dr. J. Mockus, prof. habil. dr. L. Sakalauskas, prof. habil. dr. A. Žilinskas, dr. (HP) J. Žilinskas

**Senior research staff members:** habil. dr. A. Garliauskas, dr. V. Bartkutė-Norkūnienė, dr. A. Jakaitienė, dr. O. Kurasova, dr. S. Minkevičius, dr. A. Raudys

**Research staff members:** dr. I. Belovas, dr. J. Bernatavičienė, dr. R. Karbauskaitė, dr. V. Marcinkevičius, dr. V. Medvedev, dr. J. Sušinskas, dr. P. Treigys, dr. D. Šešok

**Junior research staff members:** A. Igumenov, V. Kurauskas, R. Paulavičius

**Researchers:** V. Tiešis

**Specialists:** G. Jakimauskas

**Technicians:** J. Tamaliūnas

**Engineer programmers:** J. Katina, L. Ringienė

**Doctoral students:** G. Balkys, D. Baronas, V. Dumskis, E. Filatovas, N. Galiauskas, A. Igumenov, E. Jasutė, L. Kaklauskas, I. Katin, J. Katina, R. J. Kizlaitis, R. Kraujutis, J. Kuznecov, A. Lančinskas, M. Liogys, K. Mikėnas, A. Molytė, O. Niakšu, J. Pragarauskaitė, S. Preidys, A. Rapečka, L. Ringienė, T. Ringys, L. Savulionienė, J. Stašionis, P. Stefanovič, R. Štrimaitis, A. Ušpurienė, I. Vaičiulytė, G. Vaira, I. Vinogradova

### ***RESEARCH INTERESTS***

Medical data analysis and decision support; Data mining; Visualization of complex multidimensional data; Multiple criteria decision support systems; Statistical analysis of

multidimensional data using neural networks; Parallel computing; Global optimization methods; Local optimization methods; Creation and computational realization of complex simulation models in epidemiology, state education and state energy supply systems and of various other origin with uncertainty; Optimal control applications.

### **RESEARCH PROJECTS CARRIED OUT IN 2010**

#### **Projects Supported by University Budget 450 simbolių**

Project title: „Decisions in optimization, modelling and visualization problems“.

Main results:

1. A method is proposed for analysing the thermovision-based video data that characterize the dynamics of temperature anisotropy of the heart tissue in a spatial domain.
2. A new algorithm is proposed for selecting a regularization parameter of a local Gram matrix for the locally linear embedding applied to the visualization of multidimensional data.
3. The equivalence of two widely used global optimization models is shown.
4. New statistical model based global optimization algorithms are proposed and researched.
5. New optimization models of financial markets, mechanical systems, and school scheduling.
6. Global optimization algorithms with modified interval arithmetic and simplicial partitions have been proposed and investigated.
7. Stated and proven case of neural networks free energy function of an existence of the global minimum instead a saddle point.

#### **Projects, Programmes, Issues Supported by Lithuanian State Science and Studies Foundation**

1. Project „Liquidity analysis in order to reduce investment costs in the stock markets“. Contract No. MIP-20/2010. Dr. A. Raudys. 2010-2011.
2. Project „Global optimization algorithms with simplicial partitions“. Contract No. MIP-108/2010. Dr. (HP) J. Žilinskas. 2010-2011.
3. Project „Intersection graph structure analysis“. Contract No. MIP-52/2010. Habil. dr. M. Bloznelis. 2010.

#### **Governmental Science Programmes and Research Projects Ordered by the Branch Ministries**

1. Innovation cheque of Ministry of Economy „Algorithm for optimization of route among N points and algorithm for fixation of mean and deviation in vehicle fuel level (fuel filling/pouring out)“. Contract No. 31V-79. 2010

#### **Ordered Research Projects (pateikiamas vykdomų užsakomųjų darbų sąrašas (Lietuvos ir užsienio užsakovai))**

1. Project „Investigation of the algorithms for extraction and graphical presentation of critical physiological parameters from sensor signals“. Contract No. AS10-012. 2010

#### **International Science Programmes and Projects**

1. COST action „Open European Network for High Performance Computing on Complex Environments“. Contract No. IC0805. Dr. (HP) J. Žilinskas. 2009-2013.
2. COST action „Combining Soft Computing Techniques and Statistical Methods to Improve Data Analysis Solutions“. Contract No. IC0702. Dr. O. Kurasova. 2008-2012.
3. COST action „Algorithmic Decision Theory“. Contract No. IC0602. Prof. habil. dr. A. Žilinskas. 2007-2011.

4. LLP Erasmus Thematic Networks programme "Teaching, Research, Innovation in Computing Education. Project number 142399-LLP-1-2008-1-BG-ERASMUS-ENM. Agreement No. 2008-3258/001-001. Prof. habil. dr. A. Žilinskas. 2008-2011

## **MAIN PUBLICATIONS**

### **ARTICLES**

[**Garliauskas, Algis**]. An expansion of the neural network theory by introducing Hebb postulate / Algis Garliauskas // *Informatica*. ISSN 0868-4952. Vol. 21, no. 3 (2010), p. 339-348. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO797.htm>>.

[**Karbauskaitė, Rasa**]; [**Dzemyda, Gintautas**]; [**Marcinkevičius, Virginijus**]. Dependence of locally linear embedding on the regularization parameter / Rasa Karbauskaitė, Gintautas Dzemyda and Virginijus Marcinkevičius // *TOP*. ISSN 1134-5764. Vol. 18, no. 2 (2010), p. 354-376. Prieiga per internetą: <<http://www.springerlink.com/content/y01210v13x136n75/>>.

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[**Šešok, Dmitrij**]; [**Mockus, Jonas**]; Belevičius, Rimantas; Kačeniauskas, Arnas. Global optimization of grillages using simulated annealing and high performance computing / Dmitrij Šešok ... [et al.] // *Journal of civil engineering and management*. ISSN 1392-3730. Vol. 16, no. 1 (2010), p. 95-101. Prieiga per internetą: <<http://www.jcem.vgtu.lt/lt/3/NR/PUB/22940>>.

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[**Žilinskas, Antanas**]; [**Žilinskas, Julius**]. Interval arithmetic based optimization in nonlinear regression / Antanas Žilinskas, Julius Žilinskas // *Informatica*. ISSN 0868-4952. Vol. 21, no. 1 (2010), p. 149-158. Prieiga per internetą: <<http://www.mii.lt/Informatica/htm/INFO784.htm>>.

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- [**Igumenov, Aleksandr**]; [**Žilinskas, Julius**]; Kurowski, Krzysztof; Mackowiak, Mikołaj. Optimization of topology of truss structures using grid computing : [elektroninis išteklius] / Aleksandr Igumenov ... [et al.] // 2010 IEEE international conference on cluster computing workshops and posters (Cluster workshops) [Elektroninis išteklius] : Heraklion, Crete, Greece, September 20-24, 2010. [S.l.] : IEEE, 2010. ISBN 9781424483952. P. 1-4. Prieiga per internetą: <<http://dx.doi.org/10.1109/CLUSTERWKSP.2010.5613101>>.
- [**Jakaitienė, Audronė**]; [**Katina, Joana**]. Real business cycle model for Lithuanian economy / A. Jakaitiene, J. Katina // Computer data analysis and modeling : complex stochastic data and systems : proceedings of the Ninth international conference : Minsk, September 7-11, 2010. Vol. 2. Minsk : Publishing center BSU, 2010. ISBN 9789854768489. P. 141-144.
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<[http://www.vgtu.lt/leidiniai/leidykla/MEC\\_EurOPT\\_2010/005/0003.html](http://www.vgtu.lt/leidiniai/leidykla/MEC_EurOPT_2010/005/0003.html)>.

### **COOPERATION**

- Vilnius Pedagogical University, Vilnius, Lithuania
- Vilnius Gediminas Technical University, Vilnius, Lithuania
- Kaunas University of Technology, Kaunas, Lithuania
- Vytautas Magnus University, Kaunas, Lithuania
- Šiauliai University, Šiauliai, Lithuania
- Klaipeda University, Klaipeda, Lithuania
- Mykolas Romeris University, Vilnius, Lithuania
- University College London, UK
- University of Almeria, Spain
- The University of Edinburgh, UK
- University of Groningen, The Netherlands
- Poznan Supercomputing and Networking Center, Poland
- Middle East Technical University, Ankara, Turkey

### **OTHER SCIENTIFIC ACTIVITIES**

#### **Prof. habil. dr. G. Dzemyda –**

- editorial board member of the International Journal *Informatica* (IOSPress/VU), executive editor, <http://www.mii.lt/Informatica/editors.htm>
- editorial board member of Eastern and Central Europe Journal *Informatics in Education*, [http://www.mii.lt/informatics\\_in\\_education/editors.htm](http://www.mii.lt/informatics_in_education/editors.htm)
- editorial board member of the International Journal *Scientific Proceedings of Riga Technical University. Computer Science. Information Technology and Management Science*, <http://www.rtu.lv/en/content/view/3817/2100/lang,en/#5>
- editorial board member of the *Journal of Civil Engineering and Management*, [http://www.jcem.vgtu.lt/en/?page=2&sub=RED\\_KOLEGIJA](http://www.jcem.vgtu.lt/en/?page=2&sub=RED_KOLEGIJA)
- member of Lithuanian Computer Society, <http://www.liks.lt/>
- member of Lithuanian Mathematical Society, <http://www.mif.vu.lt/lmd/>
- member of Lithuanian Operational Research Society, <http://www.mii.lt/LitORS/>
- member of IFIP Technical Committee 12 Artificial Intelligence, <http://www.ifiptc12.org.uk/ifiptc12/members.php>

#### **Prof. habil. dr. A. Žilinskas –**

- member of editorial boards of international journals:
  - *Journal of Global Optimization* (Springer), <http://www.springer.com/business+%26+management/operations+research/journal/10898?detailsPage=editorialBoard>
  - *Control and Cybernetics*, <http://control.ibspan.waw.pl:3000/mainpage/index>
  - *Informatica* (IOSPress/VU), <http://www.mii.lt/Informatica/editors.htm>



- *Journal of Intelligent Learning Systems and Applications*, <http://www.scirp.org/journal/jilsa/>
- *International Journal of Grid and High Performance Computing*, <http://www.igi-global.com/Bookstore/TitleDetails.aspx?TitleId=1105&DetailsType=ReviewBoard>
- *The Open Cybernetics and Systemics Journal*, <http://www.bentham.org/open/tocsj/EBM.htm>
- expert of EU Eurostars
- nominated expert in EU FP7 Information and Communication Technology panel
- member of IFIP working group WG 7.6 Optimization-Based Computer Aided Modeling and Design, <http://www.ifip.org/bulletin/bulltcs/memtc07.htm>
- member of American Mathematical Society
- member of programme committees of the following International conferences:
  - Infinite and infinitesimal in mathematics, computing and natural sciences, Cetraro, Italy, May 17-21, 2010
  - 24th Mini Euro, Continuous optimization, Izmir, Turkey, June 23-26, 2010
  - Computational management science, Vienna, Austria, July, 28-30
  - CompSysTech 10, Sofia, Bulgaria, 17-18 June, 2010
  - 16th International Conference, Information Technology, Kaunas, April 21-23, 2010
  - Workshop on computational optimization, Wisla, Poland, October 18-20, 2010.
  - 6th e-learning conference, Riga, Latvia, August 25-28, 2010.

**Prof. habil. dr. J. Mockus –**

- editor-in-chief of International Journal *Informatica* (IOSPress/VU), <http://www.mii.lt/Informatica/editors.htm>
- member of editorial board of International Journal *Journal of Global Optimization* (Springer), <http://www.springer.com/business+%26+management/operations+research/journal/10898?detailsPage=editorialBoard>
- member of American Mathematical Society <http://www.ams.org/cml>
- member of IFIP Technical Committee WG 7.7 Stochastic Optimization, <http://www.ifip.org/bulletin/bulltcs/memtc07.htm>

**Dr. (HP) J. Žilinskas –**

- member of editorial boards of international journals:
  - Central European Journal of *Computer Science* (Springer/Versita), <http://versita.net/cejcs/editors/>
  - Central European Journal of *Engineering* (Springer/Versita), <http://versita.net/ceje/editors/>
  - *Computational Management Science* (Springer), <http://www.springer.com/business+%26+management/operations+research/journal/10287?detailsPage=editorialBoard>
  - *Informatica* (IOSPress/VU), <http://www.mii.lt/informatica/editors.htm>
  - *Mathematical Modelling and Analysis* (Taylor&Francis/VGTU), <http://www.tandf.co.uk/journals/journal.asp?issn=1392-6292&linktype=145>
  - *Optimization Letters* (Springer), <http://www.springer.com/mathematics/journal/11590?detailsPage=editorialBoard>
- nominated expert of Lithuania at COST domain Information and Communication Technologies, <http://w3.cost.esf.org/index.php?id=31>

- member of working group WG 4.3 "Numerical Libraries, Solvers & Algorithms" of European Exascale Software Initiative (EESI), [http://www.eesi-project.eu/pages/menu/project/working-groups.php?wp\\_id=9](http://www.eesi-project.eu/pages/menu/project/working-groups.php?wp_id=9)
- member of management committee of COST action "Open European Network for High Performance Computing on Complex Environments", [http://w3.cost.esf.org/index.php?id=177&action\\_number=IC0805](http://w3.cost.esf.org/index.php?id=177&action_number=IC0805)
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**Habil. dr. A. Garliauskas –**

- referee of international journals:
  - *Informatica* (IOSPress/VU)
  - *IEEE Transactions on Neural Networks*
- member of Lithuanian Science Society Council, <http://www.lms.lt/>
- chair person of Informatics Department of Lithuanian Science Society, <http://lms.lt/?q=en/society/browse/22>
- member of Intelligent Systems Research Laboratory at the College of Engineering, <http://www.engr.usask.ca/>
- member of Special Interest Group on Nonlinear Dynamics (SIG/NL), <http://www.acm.org/sigs>
- member of Neuroscience Special Interest Group (SIG), <http://www.inns.org/sig/>
- member of ABI research advisory board, <http://www.abiworldwide.com/>

**Dr. O. Kurasova –**

- reviewer of international journals:
  - *Informatica* (IOSPress/VU)
  - *Mathematical Mathematical Modelling and Analysis* (Taylor & Francis)
  - *Journal of Visualization* (Springer)
  - *Mechanical Systems and Signal Processing* (Elsevier)
  - *Informatics in Education* (VU)
- member of Lithuanian Computer Society (Artificial Intelligence Section), <http://www.liks.lt/>
- member of Lithuanian Mathematical Society, <http://www.mif.vu.lt/lmd/>
- member of Lithuanian Operational Research Society, <http://www.mii.lt/LitORS/>
- member of management committee of COST action „Combining Soft Computing Techniques and Statistical Methods to Improve Data Analysis Solutions“, [http://w3.cost.eu/index.php?id=110&action\\_number=IC0702](http://w3.cost.eu/index.php?id=110&action_number=IC0702)

**Dr. A. Jakaitienė –**

- referee of the international journals:
  - *Journal of Global Optimization* (Springer)
  - *Optimization Letters* (Springer)
  - *Lithuanian Mathematical Journal* (Springer)
- member of Lithuanian Mathematical Society, <http://www.mif.vu.lt/lmd/>
- member of Lithuanian Statistics Society, [http://www.statistikusajunga.lt/index.php?option=com\\_content&task=view&id=10&Itemid=12](http://www.statistikusajunga.lt/index.php?option=com_content&task=view&id=10&Itemid=12)

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**OPERATIONAL RESEARCH SECTOR  
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**RESEARCH INTERESTS**

Operational Research, Queueing theory, Stochastic OPTimization

**RESEARCH PROJECTS CARRIED OUT IN 2010**

**Projects Supported by University Budget**

Application of knowledge-based technologies to monitoring, analysis and design of information networks

Wide spread of information networks becomes the engine for development of modern technologies. Computers in information networks generate enormous amounts of data, discovery and extraction of knowledge from which is an important tool for gaining concurrence abilities in the modern dynamic environment of research and business. Exploration and control problems of information networks that are the most complicated work, created by human mind and hands, are often solved by approaching the methods of data analysis (data mining) and queuing theory. However latter methods might be also successfully

applied in many analysis and decision tasks, which occur in networks, existing in wide spectrum of business and social systems. Research focusses on following tasks aiming to main goals of the theme:

1. Network monitoring in on-line mode.
2. Queing methods for network control and design
3. Search engine optimization
4. Open source technologies

## **MAIN PUBLICATIONS**

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[**Kaklauskas, Liudvikas**]; [**Sakalauskas, Leonidas**]. Tinklo apkrovos savastingumo tyrimas realiu laiku / Liudvikas Kaklauskas, Leonidas Sakalauskas // Informacijos mokslai. ISSN 1392-0561. T. 53 (2010), p. 100-105. Prieiga per internetą: <[http://www.leidykla.vu.lt/fileadmin/Informacijos\\_mokslai/53/100-105.pdf](http://www.leidykla.vu.lt/fileadmin/Informacijos_mokslai/53/100-105.pdf)>.

Mačys, Juozas Juvencijus; [**Sušinskas, Jurgis**]. 2010 m. Kengūros konkurso apžvalga / Juozas Juvencijus Mačys, Jurgis Sušinskas // Lietuvos matematikos rinkinys. Lietuvos matematikų draugijos darbai. ISSN 0132-2818. T. 51 (2010), p. 133-138. Prieiga per internetą: <[ftp://ftp.science.mii.lt/pub/publications/51\\_TOMAS%282010%29/Matematikos\\_ir\\_Informatikos\\_Destymo\\_sekcija%2880-181%29.pdf](ftp://ftp.science.mii.lt/pub/publications/51_TOMAS%282010%29/Matematikos_ir_Informatikos_Destymo_sekcija%2880-181%29.pdf)>.

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## **COOPERATION**

University Federal Rio de Janeiro

Aalto University, Helsinki, Finland

Supercomputing centre of Galicia, Compostella de Sant-Jago, Spain

## **OTHER SCIENTIFIC ACTIVITIES**

Leonidas Sakalauskas is elected member of International Statistical Institute, Chairman of Organising Committee of the XXV EURO Conference

Vaida-Bartkute-Norkuniene is member of the Bernulli Society of Mathematical Statistics