Отчет на секция „Паралелни алгоритми“ за 2014 г.

Ръководител: проф. дн Иван Димов

1. Публикационна дейност

Публикациите във всички раздели трябва да бъдат подредени в алфавитен ред по фамилия на първия автор. **Моля, проверете наличието на пълни библиографски данни за всяка публикация.**

1.1. Статии в списания с **импакт фактор на Thomson Reuters**. Указва се и стойността на IF, както и линк към съответната страница.

- Излезли от печат през 2014 г.

1. **A. Andreev** and M. Racheva, Two-sided bounds of eigenvalues of second- and fourth-order elliptic operators, Appl. Math., Vol. 59, No. 4, pp. 371-390, 2014. **IF 0.222** http://link.springer.com/article/10.1007%2Fs10492-014-0062-6#
2. Ferencz, C., Lizunov, G., Crespon, F., Price, I., Bankov, L., Przepiórka, D., Brieß, K., Dudkin, D., Girenko, A., Korepanov, V., Kuzmych, A., Skorokhod, T., **Marinov, P**., Piankova, O., Rothkaehl, H., Shtus, T., Steinbach, P., Lichtenberger, J., Sterenharz, A., Vassileva, A. *Ionosphere waves service (IWS) - A problem-oriented tool in ionosphere and space weather research produced by POPDAT project* (2014) Journal of Space Weather and Space Climate, 4, art. no. A17, . / ISSN 2115-7251, Impact Factor (2013) 2.519 / http://www.scopus.com/inward/record.url?eid=2-s2.0-84901292632&partnerID=40&md5=d138e61af425539f9bc09b4a6f2ae14a
3. H. Chervenkov, **I. T. Dimov**, Z. Zlatev. *Spline interpolation for modelling of accumulated effects of ozone*, International Journal of Environment and Pollution, Volume 54, Number 1/2014, Pages 17-31, DOI 10.1504/IJEP.2014.064048, ISSN 0957-4352 (Print), 1741-5101 (Online), Impact factor, 0.626, http://www.speciation.net/Database/Journals/International-Journal-of-Environment-and-Pollution-;i2627
4. **J. M. Sellier** and **I. T. Dimov**. *Toward solotronics design in the Wigner formalism,* Physica A: Statistical Mechanics and its Applications, Volume 417**,** 2015, pp. 287–296 doi:10.1016/j.physa.2014.09.057, ISSN: 0378-4371, Impact Factor: 1.722(2013).
5. **J. M. Sellier** and **I. T. Dimov**. *A sensitivity study of the Wigner Monte Carlo method,* Journal of Computational and Applied Mathematics, Volume 277, 2015, pp. 87- 93, doi:10.1016/j.cam.2014.09.010, ISSN: 0377-0427, IF: 5-Year Impact Factor: 1.672.
6. **J. M. Sellier** and **I. T. Dimov**. *On the simulation of indistinguishable fermions in the many-body Wigner formalism*, Journal of Computational Physics, Volume 280, 2015, pp. 287–294, Five-Year Impact Factor: 3.184, Impact Factor (2013): 2.138, SJR indicator (2012): 1.921.
7. . **M. Sellier**, **I. T. Dimov**. *The many-body Wigner Monte Carlo Method for time-dependent Abinitio quantum simulations*, Journal of Computational Physics, Volume 273, (2014), pp. 589–597, ISSN: 0021-9991, Five-Year Impact Factor: 3.184, Impact Factor (2013): 2.138, SJR indicator (2012): 1.921.
8. **J. M. Sellier**, S. Amoroso, **M. Nedjalkov**, S. Selberherr, A. Asenov, **I. Dimov**: "Electron Dynamics in Nanoscale Transistors by Means of Wigner and Boltzmann Approaches"; Physica A, **398** (2014), 194 - 198 doi:10.1016/j.physa.2013.12.045. IF 1.722 http://www.journals.elsevier.com/physica-a-statistical-mechanics-and-its-

applications/

9. **J.M. Sellier, I. T. Dimov**. *A Wigner Approach to the Study of Wave Packets in Ordered and Disordered Arrays of Dopants*, Physica A: Statistical Mechanics and its Applications, Volume 406 (2014), pp. 185–190, Elsevier, 2014. ISSN: 0378-4371, DOI:10.1016/j.physa.2004.04.121, Five-Year Impact Factor: 1.651, Impact Factor (2012): 1.676, SJR indicator (2012): 0.634.
10. **J.M. Sellier**, **I. T. Dimov**. *A Wigner Monte Carlo Approach to Density Functional Theory*, Journal of Computational Physics, Volume 270 (2014), pp. 265–277, Elsevier, ISSN: 0021-9991. Five-Year Impact Factor: 2.851, Impact Factor (2013): 2.138, SJR indicator (2012): 1.921.
11. J**.M. Sellier, I. T. Dimov**. *The Wigner-Boltzmann Monte Carlo Method applied to electron transport in the presence of a single dopant*. Computer Physics Communications, Volume 185 (2014), pp. 2427–2435, Elsevier, ISSN: 0010-4655, http://dx.doi.org/10.1016/j.cpc.2014.05.013, Five-Year Impact Factor: 3.212, Impact Factor (2013): 3.078.
12. **J.M. Sellier, M. Nedjalkov**, **I. T. Dimov**, S. Selberherr. *A Comparison of Approaches for the Solution of the Wigner Equation*. Mathematics and Computers in Simulations, Volume 107 (2015), pp. 108–119, Elsevier, ISSN: 0378-4754, doi:10.1016/j.matcom.2014.06.001, Five-Year Impact Factor: 1.033, Impact Factor (2012): 0.836.
13. J.M. Sellier, S.M. Amoroso, **M. Nedjalkov**, S. Selberherr, A. Asenov, and **I. T. Dimov**. *Electron dynamics in nanoscale transistors by means of Wigner and Boltzmann approaches*, Physica A: Statistical Mechanics and its Applications, Volume 398 (2014), Pages 194–198, doi:10.1016/j.physa.2013.12.045, Five-Year Impact Factor: 1.651, Impact Factor (2012): 1.676, SJR indicator (2012): 0.634.
14. Milan Magdics, László Szirmay-Kalos, Balázs Tóth, **Anton A. Penzov**, *Analysis and Control of the Accuracy and Convergence of the ML-EM Iteration*. LSSC 2013, Sozopol, Bulgaria, June 3-7, 2013, LNCS vol. 8353, (2014), pp. 170-177, ISSN 0302-9743, ISBN 978-3-662-43879-4, DOI: 10.1007/978-3-662-43880-0_18.
15. P Ellinghaus, J Weinbub, M Nedjalkov, S Selberher, and **I. T. Dimov**. *Distributed-memory parallelization of the Wigner Monte Carlo method using spatial domain decomposition*, Journal of Computational Electronics, Volume 13 **(**2014), pp. 1-12, ISSN: 1569-8025 (Print) 1572-8137 (Online), DOI 10.1007/s10825-014-0635-3, 2013 Impact Factor; 1.372, Cited half-life. 4.50
16. S. Amoroso, L. Gerrer, **M. Nedjalkov**, R. Hussin, C. Alexander, A. Asenov: "Modelling Carriers Mobility in nano-MOSFETs in the Presence of Discrete Trapped Charges: Accuracy and Issues"; IEEE Transactions on Electron Devices, **61** (2014), 1292 - 1298 doi:10.1109/TED.2014.2312820. IF 2.06 http://www.researchgate.net/journal/0018-9383_IEEE_Transactions_on_Electron_Devices
17. Z Zlatev, **I. T. Dimov**, I Faragó, K Georgiev, and Á Havasi. *Application of Richardson extrapolation for multi-dimensional advection equations*, Computers & Mathematics with Applications, Volume 67, Issue 12 (2014), pp. 2279–2293, doi:10.1016/j.camwa.2014.02.028, ISSN: 0898-1221, 5-Year Impact Factor: 2.062, impact factors: 1.996(2013).
18. Z. Zlatev, K. Georgiev, and **I. T. Dimov**. *Studying absolute stability properties of the Richardson Extrapolation combined with explicit Runge–Kutta methods,* Computers & Mathematics with Applications, Volume 67, Issue 12 (2014), pp. 2294–2307, doi:10.1016/j.camwa.2014.02.025, ISSN: 0898-1221, 5-Year Impact Factor: 2.062, impact factors: 1.996(2013).

19. Z. Zlatev, **I. Dimov,** I. Farago, K. Georgiev, A. Havasi**, Tz. Ostromsky,** *Application of Richardson Extrapolation with the Crank–Nicolson Scheme for Multi–dimensional Advection*, Computers & Mathematics with Applications, Vol. 65 (2014), pp. 2279–2293, ISSN: 0898-1221, IF: 1.996 [5-year IF: 2.062] http://www.sciencedirect.com/science/article/pii/S089812211400100X JCR: http://admin-apps.webofknowledge.com/JCR/JCR?RQ=RECORD&rank=9&journal=COMPUT+MATH+APPL

- Приети за печат

1. Paul Ellinghaus, Josef Weinbub, **Mihail Nedjalkov**, Siegfried Selberherr, **Ivan Dimov**,"*Distributed-Memory Parallelization of Wigner Monte Carlo using Spatial Domain Decomposition"* Journal of Computational Electronics, IF-1.372 http://www.bioxbio.com/if/html/J-COMPUT-ELECTRON.html

1.2. Статии в списания, които нямат импакт фактор, но **имат SJR ранг на SCOPUS.** Указва се и стойността на SJR, както и линк към съответната страница.

- Излезли от печат през 2014 г.

1. **Fidanova S., Marinov P**., Atanassov K., New Estimations of Ant Colony Optimization Start Nodes, Int. J. Control and Cybernetics, Vol 43(3) Polish Academy of Science, ISSN 0324-8569, SJR 0.290, F(2008) 0.380, 2014, 271 – 285.
2. **Fidanova S., Marinov P**., Paprzycki M, *Influence of the Number of Ants on Multy-Objective Ant Colony Optimization Algorithm for Wireless Sensor Network Layout,* Large-Scale Scientific Computing, Lecture Notes in Computer Science, (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), Springer, Germany, 8353 LNCS, 2014, pp. 232-239.. / ISSN 0302-9743, SJR 0.310 / http://www.scopus.com/inward/record.url?eid=2-s2.0-84904092991&partnerID=40&md5=cfd1c9e8537d83667b87af4d2de2d177
3. **J. M. Sellier, M. Nedjalkov, I. Dimov**, S. Selberherr: "A benchmark study of the Wigner Monte Carlo method"; Monte Carlo Methods and Applications, **20** (2014), 43 - 51 doi:10.1515/mcma-2013-0018. SJR = 0.298 http://www.scimagojr.com/journalsearch.php?q=21100199332&tip=sid&clean=0
4. **J. M. Sellier, M. Nedjalkov, I. Dimov**, S. Selberherr: "The Multi-Dimensional Transient Challenge: The Wigner Particle Approach"; Invited talk: International Workshop on Computational Electronics (IWCE), Paris, France; 03.06.2014 - 06.06.2014; in "*17th International Workshop on Computational Electronics (IWCE 2014)*", (2014), ISBN: 978-2-9547858-0-6, 119 - 120. SJR=0.135 http://www.scimagojr.com/journalsearch.php?q=21100216329&tip=sid&clean=0
5. **JM Sellier, M Nedjalkov**, **I . T. Dimov**, and S. Selberherr. *The role of annihilation in a Wigner Monte Carlo approach,* Large-Scale Scientific Computing, Lecture Notes in Computer Science, Volume 8353**,** Pages 186-193 (Editors: Ivan Lirkov, Svetozar Margenov, Jerzy Waśniewski), ISBN: 978-3-662-43879-4 (Print) 978-3-662-43880-0 (Online) 2014, SJR 0.310 pp 186-193, 2014, http://scholar.google.bg/citations?view_op=view_citation&hl=en&user=pl2RrEEAAAAJ&sortby=pubdate&citation_for_view=pl2RrEEAAAAJ:g3aElNc5_aQC
6. **J.M. Sellier, M. Nedjalkov**, **I. T. Dimov**, S. Selberherr. *A benchmark study of the Wigner Monte-Carlo method,* Monte Carlo Methods and Applications, Volume 20,

Issue 1 (Mar 2014), Pages 43–51, ISSN (Online) 1569-3961, ISSN (Print) 0929-9629, De Gruyter, 2014. DOI: 10.1515/mcma-2013-0018, Mathematical Citation Quotient: 0.12, SJR indicator (2012): 0.224, http://scholar.google.bg/citations?view_op=view_citation&hl=en&user=pl2RrEEAAAAJ&sortby=pubdate&citation_for_view=pl2RrEEAAAAJ:zLWjf1WUPmwC

7. L. Wang, A. Brown, **M. Nedjalkov**, C. Alexander, B. Cheng, C. Millar, A. Asenov: "3D Coupled Electro-Thermal FinFET Simulations Including the Fin Shape Dependence of the Thermal Conductivity" ;"*Proceedings of the 19th International Conference on Simulation of Semiconductor Processes and Devices (SISPAD)*", (2014), ISBN: 978-1-4799-5285-4, 269 - 272 doi:10.1109/SISPAD.2014.6931615. SJR=0.239 http://www.scimagojr.com/journalsearch.php?q=98243&tip=sid&clean=
8. P. Ellinghaus, **M. Nedjalkov**, S. Selberherr: "Efficient Calculation of the Two-Dimensional Wigner Potential";Talk: International Workshop on Computational Electronics (IWCE), Paris, France; 03.06.2014 - 06.06.2014; in "*The 17th International Workshop on Computational Electronics*", (2014), ISBN: 978-2-9547858-0-6, 19 - 20 doi:10.1109/IWCE.2014.6865812. SJR=0.135 http://www.scimagojr.com/journalsearch.php?q=21100216329&tip=sid&clean=0
9. P. Ellinghaus, **M. Nedjalkov**, S. Selberherr: "Implications of the Coherence Length on the Discrete Wigner Potential"; Poster: International Workshop on Computational Electronics (IWCE), Paris, France; 03.06.2014 - 06.06.2014; in "*The 17th International Workshop on Computational Electronics*", (2014), ISBN: 978-2-9547858-0-6, 155 - 156 doi:10.1109/IWCE.2014.6865852. SJR=0.135 http://www.scimagojr.com/journalsearch.php?q=21100216329&tip=sid&clean=0
10. P. Ellinghaus, **M. Nedjalkov**, S. Selberherr: "The Wigner Monte Carlo Method for Accurate Semiconductor Device Simulation"; "*Proceedings of the 19th International Conference on Simulation of Semiconductor Processes and Devices (SISPAD)*", (2014), ISBN: 978-1-4799-5285-4, 113 - 116 doi:10.1109/SISPAD.2014.6931576. SJR=0.239 http://www.scimagojr.com/journalsearch.php?q=98243&tip=sid&clean=0
11. P. Szmeja, K. Wasielewska, M. Ganzha, M. Drozdowicz, M. Paprzycki, **S. Fidanova**, I. Lirkov, Reengineering and Extending the Agents in Grid Ontology, Large-Scale Scientific Computing, Lecture Notes in Computer Science 8353, Springer, Germany, ISSN 0302-0743, SJR 0.310, DOI 10.1007/978-3-662-43880-0_65, 2014, 565 – 574.
12. Roeva O., **Fidanova S**., Atanassova V., Hybrid ACO-GA for Parameter Identification of an E. coli Cultivation Process Model, Large-Scale Scientific Computing, Lecture Notes in Computer Science 8353, Springer, Germany, ISSN 0302-9743, SJR 0.310, DOI 10.1007/978-3-662-43880-0_35, 2014, 321 – 328.
13. Sotirova E., Velizarova E., **Fidanova S**., Atanasov K., Modeling Forest Fire Spread through a Game Method for Modeling Based on Hexagonal Cells, Large-Scale Scientific Computing, Lecture Notes in Computer Science 8353, Springer, Germany, ISSN 0302-9743, DOI 10.1007/978-3-662-43880-0_36, SJR 0.310 2014, 296 – 306.
14. P Schwaha, **M Nedjalkov**, S Selberherr, JM Sellier, **I. T. Dimov**, and **R. Georgieva.** *Stochastic Formulation of Newton's Acceleration,* Large-Scale Scientific Computing, Lecture Notes in Computer Science, Volume 8353, Pages 178-185 (Editors: Ivan Lirkov, Svetozar Margenov, Jerzy Waśniewski), ISBN: 978-3-662-43879-4 (Print) 978-3-662-43880-0 (Online) 2014, pp 186-193, 2014, *http://rd.springer.com/chapter/10.1007/978-3-662-43880-0_19*
15. Z. Zlatev, K. Georgiev, and **I. T. Dimov**. *Stability Properties of Explicit Runge-Kutta Methods Combined with Richardson Extrapolation,* Large-Scale Scientific Computing, Lecture Notes in Computer Science, Volume 8353, Pages 428-435 (Editors: Ivan Lirkov, Svetozar Margenov, Jerzy Waśniewski), ISBN: 978-3-662-

43879-4 (Print) 978-3-662-43880-0 (Online), SJR 0.31,0 2014, pp 186-193, http://scholar.google.bg/citations?view_op=view_citation&hl=en&user=pl2RrEEAAAAJ&sortby=pubdate&citation_for_view=pl2RrEEAAAAJ:hMsQuOkrut0C

- Приети за печат

1. **A. B. Andreev** and M. R. Racheva, On a Type of Nonconforming Morley Rectangular Finite Element, Springer LNCS, SJR 0.310, 282-289.
2. **A. B. Andreev** and M. R. Racheva, The Effect of a Postprocessing Procedure to Upper Bounds of the Eigenvalues, Springer LNCS, SJR 0.310, 273-281.
3. **Fidanova S.**, Pop P., An Ant Algorithm for the Partitioned Graph Coloring Problem, Numerical Methods and Applications, Lecture Notes in Computer Science, Springer, Germany, ISSN 0302-0743, SJR 0.310 (accepted).
4. **I. Dimov, M. Nedjalkov, J. M. Sellier**, S. Selberherr: "Neumann Series Analysis of the Wigner Equation Solution"; Mathematics in Industry (http://www.springer.com/series/4650?detailsPage=subseries) SJR=0.647 http://www.scopus.com/source/eval.url?utm_source=scblog&utm_medium=link&utm_content=ja&utm_campaign=journalmetrics
5. J. Cervenka, P. Ellinghaus, **M. Nedjalkov**: "Deterministic Solution of the Discrete Wigner Equation"; Talk: International Conference on Numerical Methods and Applications, Borovets, Bulgaria; 20.08.2014 - 24.08.2014; Lecture Notes in Computer Science (LNCS) SJR 0.310
6. P. Ellinghaus, **M. Nedjalkov**, S. Selberherr: "Optimized Particle Regeneration Scheme for the Wigner Monte Carlo Method"; Talk: International Conference on Numerical Methods and Applications, Borovets, Bulgaria; 20.08.2014 - 24.08.2014;Lecture Notes in Computer Science (LNCS) SJR 0.310

1.3. Публикации, които нямат нито IF, нито SJR, но **се реферират или в ISI Web Of Knowledge на Thomson Reuters, или в SCOPUS**. Дава се и линк към съответната база данни.

- Излезли от печат през 2014 г.

1. **I. T. Dimov**, S. Maire, J. **M. Sellier**. *A New Walk on Equations Monte Carlo Method for Linear Algebraic Problems,* HAL - Inria/ Open archive**,** 2014, HAL Id: hal-00979044 https://hal.inria.fr/hal-00979044, https://hal.inria.fr/hal-00979044/, https://hal.inria.fr/hal-00979044/document

- Приети за печат

1.4. Публикации, които са **реферирани и индексирани в световната система за реферране, индексиране и оценяване**, но не са включени в базите данни Web of Science или SCOPUS (например, Google Scholar). (Прилагам и файл с данни за реферране/индексиране на списания, издавани от институтите на БАН). Дава се линк към съответната база или към страницата от списание, където се указва, че то се реферира.

- Излезли от печат през 2014 г.

1. **Fidanova S., Marinov P**., Paparzycki M., Multi-Objective ACO Algorithm for WSN Layout: Performance According Number of Ants, J. of Metaheuristics, Vol 3(2), ISSN 1755-2176, 2014,DOI 10.1504/IJMHEUR.2014.063145, 149 -- 161. - http://www.inderscience.com/jhome.php?jcode=ijmheur
2. **Fidanova S**., Paprzycki M., Roeva O., Hybrid GA-ACO Algorithm for a Model Parameter Identification Problem, In proc. of FedCSIS 2014 conference, IEEE Xplorer, IEEE catalog number CFP1485N-ART, ISSN 2300-5963, ISBN 978-83-60810-58-32014, DOI 10.15439/2014F373, 2014, pp. 413 - 420.
3. Roeva O., **Fidanova S**., Parameter Identification of an E.coli Cultivation Peocess Model Using Hybrid Methaeuristics, J. of Metaheuristics, Vol 3(2), ISSN 1755-2176, 2014, 10.1504/IJMHEUR.2014.063143, 133 -- 148. - http://www.inderscience.com/jhome.php?jcode=ijmheur

- Приети за печат

1.5. Публикации **без реферирane или индексиране** в световната система реферирane и индексиране.

- Излезли от печат през 2014 г.

1. Avdzhieva, Ana; Aleksov, Dragomir; Hristov, Ivan; Shegunov, Nikolai; **Marinov, Pencho**; *Circular arc spline approximation of pointwise curves for use in NC programing*, Organizers: Institute of Information and Communication Technologies, 104-th European Study Group with Industry (ESGI'104),Problems and Final Reports, September 23-27, 2014, Sofia, Bulgaria, pp. 94-101, ISBN 978-954-9526-87-5 / http://eprints.ugd.edu.mk/11515/3/ESGI104.pdf#page=94
2. **Fidanova S., Marinov P**., Wind model in a wild fire spread, In proc of Numerical Methods for Scientific Computations and Advanced Applications, K. Georgiev editor, ISBN 975-954-91700-7-8, 2014, pp. 31 – 34
3. **Fidanova S., Marinov P**., Parallel Algorithm for Field Fire Simulation Mathematics in Industry, Cambridge Scholars Publishing, Proc of SIAM'2013, ISBN(10): 1-4438-6401-3, 2014, pp. 78 - 87.
4. I. Kutiev, **P. Marinov**, A. Belehaki, I.Tsagouri. *TaD Model of Topside Ionosphere and Plasmasphere for GNSS Applicat.* Proceedings of the Fourth International Symposium on Radio Systems and Space Plasma, 30-31.10.2014, Ruse, Bulgaria, ISRSSP'2014, pp.18-26 /ISBN: 978-619-90124-2-0/ http://www.isrssp.org
5. **Tz. Ostromsky,** *Improved Implementation of a Large-Scale Air Pollution Model*. Mathematics and Industry, Cambridge & Scholars Publishing (2014), pp. 132 – 144.

- Приети за печат

1.6. **Монографии**

- Излезли от печат през 2014 г.
- Приети за печат

1.7. **Глави от книги**

- Излезли от печат през 2014 г.

1. Roeva O., **Fidanova S**., Paprzycki M., Population Size Influence on the Genetic and Ant Algorithms Performance in Case of Cultivation Process Modelling, Recent Advances in Computational Optimization: Results of the Worcshop on Computational Optimization WCO 2013, Studies in Computational Intelligence 580, S. Fidanova (editor), book Chapter 7, ISBN 978-3-319-12630-2 Springer, ,

- Приети за печат

1.8. **Научни сборници или специални издания на списания**, на които ученият от института е редактор (съставител)

- Излезли от печат през 2014 г.

1. Metaheuristics for Large Scale Problems,Special issue, J. of Metheuristics, Vol. 3(2), gest editors **S. Fidanova** and Gabriel Luque, Inderscience publisher, ISSN 1755-2176, 2014.

- Приети за печат

1.9. **Учебници, учебни помагала**

- Излезли от печат през 2014 г.
- Приети за печат

1.10. **Научно-популярни произведения**

- Излезли от печат през 2014 г.
- Приети за печат

1.11. *Съвместни публикации с чуждестранни учени (общо от всички останали видове)*

- Излезли от печат през 2014 г.

1. **Fidanova S., Marinov P**., Paprzycki M, Influence of the Number of Ants on Multy-Objective Ant Colony Optimization Algorithm for Wireless Sensor Network Layout, Large-Scale Scientific Computing, Lecture Notes in Computer Science 8353, Springer, Germany, ISSN 0302-9743, SJR 0.310, 2014, 208 -- 215.
2. **Fidanova S., Marinov P**., Paparzycki M., Multi-Objective ACO Algorithm for WSN Layout: Performance According Number of Ants, J. of Metaheuristics, Vol 3(2), ISSN 1755-2176, 2014, 149 – 161.
3. **Fidanova S.**, Paprzycki M., Roeva O., Hybride GA-ACO Algorithm for a Model Parameter Identification Problem, In proc. of FedCSIS 2014 conference, IEEE Xplorer, IEEE catalog number CFP1485N-ART, ISSN 2300-5963, ISBN 978-83-60810-58-32014, DOI 10.15439/2014F373, 2014, pp. 413 – 420.
4. **Fidanova S**., Pop P., An Ant Algorithm for the Partitioned Graph Coloring Problem, Numerical Methods and Applications, Lecture Notes in Computer Science, Springer, Germany, ISSN 0302-0743, SJR 0.310 (accepted).
5. **JM Sellier, M Nedjalkov**, **I . T. Dimov**, and S. Selberherr. *The role of annihilation in a Wigner Monte Carlo approach*, Large-Scale Scientific Computing, Lecture Notes in Computer Science, Volume 8353**,** Pages 186-193 (Editors: Ivan Lirkov, Svetozar Margenov, Jerzy Waśniewski), ISBN: 978-3-662-43879-4 (Print) 978-3-662-43880-0 (Online) 2014, pp 186-193, 2014, http://scholar.google.bg/citations?view_op=view_citation&hl=en&user=pl2RrEEAAAAJ&sortby=pubdate&citation_for_view=pl2RrEEAAAAJ:g3aElNc5_aQC

6. **I. T. Dimov**, S. Maire, **J. M. Sellier**. *A New Walk on Equations Monte Carlo Method for Linear Algebraic Problems,* HAL - Inria/ Open archive**,** 2014, HAL Id: hal-00979044, https://hal.inria.fr/hal-00979044, https://hal.inria.fr/hal-00979044/, https://hal.inria.fr/hal-00979044/document
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2.1 Полза / ефект за обществото от извършваните дейности

Кратко опишете най-важните дейности (проекти), извършвани във вашата секция от гледната точка на тяхната полза / ефект за обществото.

Методите Монте Карло се смятат за най-надеждните методи за моделиране на електронен пренос в полупроводници. През последните години при моделирането на устройства се налагат толкова малки скали по отношение на пространството и времето, че протичащите процеси не биха могли да се разглеждат като полупроводников транспорт и затова е необходима квантова интерпретация. Разработени и изследвани са ефективни Монте Карло алгоритми за задачи на линейната алгебра с плътни, разредени

и структурирани матрици. Целта е да се разработят и ефективни паралелни реализации на разработените алгоритми за задачи с голяма размерност. Разработени и изследвани са ефективни и свръхсходящи Монте Карло алгоритми за числено пресмятане на многомерни интеграли, като се изследва и изчислителната сложност на алгоритмите. Изследователските усилия са насочени и към прилагането на нови подходи в компютърната графика и проектирането на ефективни Монте Карло и квази Монте Карло методи за създаване на фотореалистични изображения.

Разработвани са метаевристични и стохастични методи за задачи от икономиката (управление на ресурси), телекомуникации (управление на сензори и радари, GPS мрежи), биология (моделиране на биореактор) и др. Изследванията са свързани с намиране на най-подходящия метод за даден тип задачи и конструиране на оптимален алгоритъм по отношение на изчислителната сложност и използването на паметта.

Разработван е модел за разпространение на полски и горски пожари. При това изследване е използван игрови модел, като областта на развитие на пожара е представена чрез шестоъгълна мрежа. Моделът отчита повърхнината, наличието на вятър и разнообразни горими материали.

2.2. Взаимоотношения с институции

В тази точка направете обобщаване на най-важните аспекти от експертната дейност на вашата секция съгласно индивидуалните отчети.

Членовете на секцията са представили общо 24 рецензии и становища за присъждане на научни степени и звания и 136 рецензии за научни издания.

2.3. Практически дейности, свързани с работата на национални правителствени и държавни институции, индустрията, енергетиката, околната среда, селското стопанство, национални културни институции и др.

Опишете общонационални и оперативни дейности, извършвани във вашата секция, които обслужващи държавата (например НГИ, БИОМ и т.н.)

2.4. Проекти, свързани с общонационални и оперативни дейности, обслужващи държавата и обществото, финансирани от национални институции (без Фонд "Научни изследвания"), програми, националната индустрия и пр.

Опишете **ДО ТРИ** такива проекта, изпълнявани от вашата секция

Моля, дайте и списък на подадени от вашата секция проекти по програма Хоризонт 2020.

3. РЕЗУЛТАТИ ОТ НАУЧНАТА ДЕЙНОСТ ПРЕЗ 2014 г.:
3.1 Моля, опишете **ЕДНО най-важно и ярко научно постижение**,
ЕФЕКТИВНИ МОНТЕ КАРЛО АЛГОРИТМИ

Методите Монте Карло се смятат за най-надеждните методи за моделиране на електронен пренос в полупроводници. През последните години при моделирането на устройства се налагат толкова малки скали по отношение на пространството и времето, че протичащите процеси не биха могли да се разглеждат като полупроводников транспорт и затова е необходима квантова интерпретация. Разработени и изследвани са ефективни Монте Карло алгоритми за задачи на линейната алгебра с плътни, разредени и структурирани матрици. Целта е да се разработят и ефективни паралелни реализации на разработените алгоритми за задачи с голяма размерност. Разработени и изследвани са ефективни и свръхсходящи Монте Карло алгоритми за числено пресмятане на многомерни интеграли, като се изследва и изчислителната сложност на алгоритмите. Изследователските усилия са насочени и към прилагането на нови подходи в компютърната графика и проектирането на ефективни Монте Карло и квази Монте Карло методи за създаване на фотореалистични изображения. Разработени са метаевристични и стохастични методи за задачи от икономиката (управление на ресурси), телекомуникации (управление на сензори и радари, GPS мрежи), биология (моделиране на биореактор) и др. Това са Монте Карло методи за решаване на оптимизационни задачи с голяма изчислителна сложност. Изследванията са свързани с намиране на най-подходящия метод за даден тип задачи и конструиране на оптимален алгоритъм по отношение на изчислителната сложност и използването на паметта.

Постигнатите резултати са публикувани в 39 рабти както следва: една глава от книга, 14 в издания с импакт фактоер, 16 в издания с SJR фактор и 8 в томове с доклади от международни конференции.
Ръководител на колектива проф. Иван Димов

3.2 Моля, опишете **ЕДНО най-важно и ярко научно-приложно постижение**
МОДЕЛИРАНЕ НА АКТУАЛНИ ПРОБЛЕМИ НА ОКОЛНАТА СРЕДА
Разработен е модел за разпространение на полски и горски пожари. При това изследване е използван игрови модел, като областта на развитие на пожара е представена чрез шестоъгълна мрежа. Моделът отчита повърхнината, наличието на вятър и разнообразни горими материали. Моделът е тестван върху разнообразни специално подбрани тестови примери. Наблюдава се реалистично разпространение на пожара. Сред тестовите примери е вятър с една и съща скорост, но в различни посоки, установява се, че има сходно разпространение на пожара. Друг пример е ветрове с една и съща посока но с различна скорост и се вижда разликата в скоростите на разпространение на пожара и на фронта на пожара. Тествано е разпространение на пожар при наклонени плоскости с различен ъгъл на наклона, както и в хълмиста област. Изготвена е методика за оценка на горимите материали с помощта на GIS инструменти, които да отговарят на съществуващите класификации от (Андерсон, 1982) и (Скот-Бърган, 2005). Наличието на тези данни ще спомогне за сравняване на различни модели за разпространение на пожари, както и за сравняване на получените от моделите резултати за пожари в миналото и доколко точно е калибриран моделът. На тяхна база може да се разработват различни сценарии за пожароопасни зони и за вземане на предварителни мерки от компетентните служби.
Описани са симулации на систематичните промени на емисиите от човешка дейност в Европа. За симулациите са приложени внимателно избрани серии от възможни сценарии. Проучено е въздействието на тези промени върху нивата на замърсяване в различни части от Европа. Едно от заключенията в резултат на проведените числени експерименти е, че промените в различните части на Европа могат да бъдат твърде различни, въпреки че емисиите се редуцират с еднакъв показател.

Постигнантите резултати са публикувани в 12 статии: 4 в списания с импакт фактор, 2 в издания с SJR и 8 в томове с доклади от международни конференции.

Ръководител на разработката е доц. д-р Стефка Фиданова

Тези две постижения да бъдат описани общо в обем до **1 страница текст**.

ЗА ВСЯКО ПОСТИЖЕНИЕ ЯСНО ДА СЕ ФОРМУЛИРА НА ДОСТЪПЕН ЕЗИК НЕ САМО НЕГОВАТА СЪЩНОСТ, НО И ЗНАЧИМОСТТА МУ ЗА НАУКАТА И ОБЩЕСТВОТО. Да се посочи името на ръководителя на **разработката. Предложенията за "постижения", които са описание не на резултати, а на научно-изследователска дейност няма да бъдат включени в Годишния отчет на института.**

4. МЕЖДУНАРОДНО НАУЧНО СЪТРУДНИЧЕСТВО НА ЗВЕНОТО:

4.1. В рамките на договори и спогодби на ниво Академия,
4.2 В рамките на договори и спогодби на институтско ниво.

Моля, опишете **до ТРИ най-значими, международно финансирани проекти**, в които участва вашата секция, съгласно приведената по-горе разбивка **(до 1 страница общо).**

4.3 Организиране на международни конференции

Моля, дайте кратко описание на международни конференции, организирани през 2014 г. от вашата секция.

- *NMA 2014* – Организиране на 8-та Международна конференция по Числени методи и приложения, проведена от 20-24 август 2014 в Боровец. Приетите доклади от научния комитет бяха представени в 6 специални сесии в 11 научни направления. Общият брой на участниците беше 75, от 21 държави, а именно, България, Германия, Австрия, Великобритания, Китай, САЩ, Белгия, Испания, Чехия, Швейцария, Норвегия, Гърция, Турция, Словакия, Полша, Русия, Швеция, Холандия, Дания, Франция и Канада. Петима световно известни учени бяха поканени като специални лектори. Трудовете на конференцията са отпечатани в реномираната поредица *Lecture Notes in Computer Science* на издателство Springer.

- **Workshop on Combinatorial Optimization 2014 –** Варшава, Полша седмият „**Workshop on Combinatorial Optimization**“ се проведе в рамките на FedCSIS'2014. Бяха изпратени над 30 статии, като 18 от тях бяха приети за докладване и включени в тома от конференцията. Участниците в конференцията бяха от 10 държави, както следва: Австралия, Япония, Германия, Белгия, Франция, Италия, Полша, Словакия, Турция, Словения. Трудовете на конференцията са достъпни в IEEE Xplorer. Разширени версии на приетите и изнесени доклади се публикуват в реномираната поредица Studies in Computational Inelligence на издателство Springer.

5. Участие на звеното в подготовката на специалисти: форми, сътрудничество с учебни заведения, външни заявители, включително от чужбина.

Моля, опишете участие на членове на вашата секция в такива проекти като **TEMPUS, ERASMUS, Life Long learning, COST и т.н.**

1. Стефка Фиданова, ERASMUS със Southampton Solent University
2. Стефка Фиданова, COST Action 1207 – делегат в управителния съвет