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Education

- Ph.D., Electrical Engineering, 2003, University of Ljubljana
Dissertation: “Asynchronous Parallel Direct Optimization Algorithms for Analog Electronic Circuits”
- M.Sc., Electrical Engineering, 1999, University of Ljubljana
Thesis: “Interrupts in a Multitasking OS”

Positions held

- 1999: support engineer, Thomatronik GmbH, Rosenheim, Germany
- 2000-2002: junior researcher, University of Ljubljana, Faculty of Electrical Engineering
- 2002-2011: teaching assistant, University of Ljubljana, Faculty of Electrical Engineering
- 2012-2015: associate professor, University of Ljubljana, Faculty of Electrical Engineering
- 2016-present: full professor, University of Ljubljana, Faculty of Electrical Engineering
- 2016-2023: Deputy Head of Department of Electronics
- 2023-present: Faculty of Electrical Engineering Senate, member

Other activities

- 2000-2016: webmaster, University of Ljubljana, Faculty of Electrical Engineering
- 2016-present: associate editor at MIDE - Journal of Microelectronics, Electronic Components and Materials
- DATE 2016: member of Technical Programme Committee
(DT5 Design and Test for Analog and Mixed-Signal Systems and Circuits)

Courses

- Analog Electronics
- Linear Electronics
- Microprocessor Systems in Telecommunications
- Circuit Analysis and Optimization
- Optimization in Electronic Design Automation

Research interests

- Modeling of analog circuits and mixed systems
- Simulation of continuous and discrete time systems
- Optimization algorithms
- Embedded systems

Projects and research programmes

- 1999-2001: Introducing Optimization to the SPICE 3f4 Concept
- 2004-2008: Algorithms and Optimization Methods in Telecommunications
- 2009-2014: Algorithms and Optimization Methods in Telecommunications
- 2015-2018: Algorithms and Optimization Methods in Telecommunications

- 1999-2024: ICT4QoL - Information and Communications Technologies for Quality of Life
- 2017: consulting for Veritools, Inc.
- 2019: parasitics simulations, HELLA Saturnus Slovenija d.o.o.
- 2024-2025: NLNET 2024-04-081: Verilog-A Distiller

Software

- SPICE OPUS analog circuit simulator
<https://www.spiceopus.si>
- PyOPUS library for circuit simulation and optimization
<https://fides.fe.uni-lj.si/pyopus>
- Grid-restrained Nelder-Mead simplex algorithm
<https://fides.fe.uni-lj.si/~arpadb/software-grnm.html>
- Python interface to CUTer test problems for optimization
<https://fides.fe.uni-lj.si/~arpadb/software-pycuter.html>
- Ngspice circuit simulator, bug fixes
<https://ngspice.sourceforge.io/>
- OpenVAF Verilog-A compiler, maintenance and implementation of new features
<https://github.com/arpadbuermen/OpenVAF>
- Verilog-A Circuit Analysis Kernel (VACASK) analog circuit simulator
<https://codeberg.org/arpadbuermen/VACASK>
- Verilog-A Distiller – a converter for compact models from SPICE3 C format into Verilog-A
<https://codeberg.org/arpadbuermen/VADistiller>

Selected publications

- BÜRMEN, Arpad, TUMA, Tadej, FAJFAR, Iztok, PUHAN, Janez, ROJEC, Žiga, KUNAVER, Matevž, TOMAŽIČ, Šašo. Free software support for compact modelling with Verilog-A. *Informacije MIDEM : Journal of Microelectronics, Electronic Components and Materials*, 2014, letn. 54, št. 4, str. 271-281, ISSN 0352-9045. <https://ojs.midem-drustvo.si/index.php/InfMIDEM/article/view/1999>, DOI: <https://doi.org/10.33180/InfMIDEM2024.404>.
[http://www.midem-drustvo.si/Journal%20papers/MIDEM_46\(2016\)2p57.pdf](http://www.midem-drustvo.si/Journal%20papers/MIDEM_46(2016)2p57.pdf),
- FAJFAR, Iztok, ROJEC, Žiga, BÜRMEN, Arpad, KUNAVER, Matevž, TUMA, Tadej, TOMAŽIČ, Šašo, PUHAN, Janez. Imperative genetic programming. Symmetry. Sep. 2024, vol. 16, iss. 9, 19 pages, ISSN 2073-8994. <https://www.mdpi.com/2073-8994/16/9/1146>, DOI: 10.3390/sym16091146.
- Žiga Rojec, Iztok Fajfar, Arpad Bürmen, "Evolutionary synthesis of failure-resilient analog circuits", *Mathematics*, Jan.-1 2022, iss. 1, 156, str. 1-20, ilustr., ISSN 2227-7390, <https://www.mdpi.com/2227-7390/10/1/156>, DOI: [10.3390/math10010156](https://doi.org/10.3390/math10010156).
- Matevž Kunaver, Arpad Bürmen, Iztok Fajfar, "Automatic grammatical evolution-based optimization of matrix factorization algorithm", *Mathematics*, Apr.-1 2022, iss. 7, 1139, str. 1-22, ilustr., ISSN 2227-7390, <https://www.mdpi.com/2227-7390/10/7/1139>, DOI: [10.3390/math10071139](https://doi.org/10.3390/math10071139).
- Žiga Rojec, Tadej Tuma, Jernej Olenšek, Arpad Bürmen, Janez Puhon, "Meta-optimization of dimension adaptive parameter schema for Nelder–Mead algorithm in high-dimensional problems", *Mathematics*, Jul.-1 2022, iss. 13, 2288, str. 1-16, ilustr., ISSN 2227-7390, <https://www.mdpi.com/2227-7390/10/13>, DOI: [10.3390/math10132288](https://doi.org/10.3390/math10132288).
- Arpad Bürmen, Tadej Tuma, Jernej Olenšek, "Randomized simplicial Hessian update", *Mathematics*, Aug.-1 2021, iss. 15, 1775, str. 1-18, ilustr., ISSN 2227-7390, <https://www.mdpi.com/2227-7390/9/15/1775>, DOI: [10.3390/math9151775](https://doi.org/10.3390/math9151775).
- Matevž Kunaver, Mark Žic, Iztok Fajfar, Tadej Tuma, Arpad Bürmen, Vanja Subotić, Žiga Rojec, "Synthesizing electrically equivalent circuits for use in electrochemical impedance spectroscopy"

through grammatical evolution", *Processes*, [Online ed.], Nov. 2021, iss. 11, 1859, str. 1-17, ilustr., ISSN 2227-9717, <https://www.mdpi.com/2227-9717/9/11/1859>, DOI: [10.3390/pr9111859](https://doi.org/10.3390/pr9111859).

- Janez Puhan, Arpad Bürmen, Tadej Tuma, Iztok Fajfar, "Irradiance in mixed coherent/incoherent structures : an analytical approach", *Coatings*, Sep. 2019, vol. 9, iss. 9, str. 1-16, ilustr., ISSN 2079-6412, <https://www.mdpi.com/2079-6412/9/9/536>, DOI: [10.3390/coatings9090536](https://doi.org/10.3390/coatings9090536).
- Arpad Bürmen, Iztok Fajfar, "Mesh adaptive direct search with simplicial Hessian update", *Computational optimization and applications*, [Print ed.], 2019, vol. 74, str. 645-667, ilustr., ISSN 0926-6003, <https://link.springer.com/article/10.1007%2Fs10589-019-00133-6>, DOI: [10.1007/s10589-019-00133-6](https://doi.org/10.1007/s10589-019-00133-6).
- Žiga Rojec, Arpad Bürmen, Iztok Fajfar, "Analog circuit topology synthesis by means of evolutionary computation", *Engineering applications of artificial intelligence*, [Print ed.], Apr. 2019, vol. 80, str. 48-65, ilustr., ISSN 0952-1976, <https://www.sciencedirect.com/science/article/pii/S0952197619300119>, DOI: [10.1016/j.engappai.2019.01.012](https://doi.org/10.1016/j.engappai.2019.01.012).
- Iztok Fajfar, Arpad Bürmen, Janez Puhan, "The Nelder-Mead simplex algorithm with perturbed centroid for high-dimensional function optimization", *Optimization letters*, 2019, 13, str. 1011-1025, ilustr., ISSN 1862-4472, <https://link.springer.com/article/10.1007/s11590-018-1306-2>, DOI: [10.1007/s11590-018-1306-2](https://doi.org/10.1007/s11590-018-1306-2).
- Iztok Fajfar, Arpad Bürmen, Janez Puhan, "Grammatical evolution as a hyper-heuristic to evolve deterministic real-valued optimization algorithms", *Genetic programming and evolvable machines*, [Print ed.], Dec. 2018, vol. 19, iss. 4, str. 473-504, ilustr., ISSN 1389-2576, <https://link.springer.com/article/10.1007/s10710-018-9324-5>, DOI: [10.1007/s10710-018-9324-5](https://doi.org/10.1007/s10710-018-9324-5).
- Iztok Fajfar, Janez Puhan, Arpad Bürmen, "Evolving a Nelder-Mead algorithm for optimization with genetic programming", *Evolutionary computation*, Fall 2017, vol. 25, no. 3, str. 351-373, ilustr., ISSN 1063-6560, http://www.mitpressjournals.org/doi/abs/10.1162/evco_a_00174, DOI: [10.1162/EVCO_a_00174](https://doi.org/10.1162/EVCO_a_00174).
- Janez Puhan, Benjamin Lipovšek, Arpad Bürmen, Iztok Fajfar, "An accurate representation of incoherent layers within one-dimensional thin-film multilayer structures with equivalent propagation matrices", *IEEE photonics journal*, [Online ed.], Oct. 2017, vol. 9, no 5, 13 str., ilustr., ISSN 1943-0655, <http://ieeexplore.ieee.org/document/7983348/>, DOI: [10.1109/JPHOT.2017.2728535](https://doi.org/10.1109/JPHOT.2017.2728535).
- Jernej Olenšek, Arpad Bürmen, "Population ranking based differential evolution with simulated annealing for circuit optimization = Optimizacija vezij z diferencialno evolucijo in simuliranim ohlajanjem na osnovi rangiranja populacije", *Informacije MIDEM : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], 2016, letn. 46, št. 2, str. 57-64, ilustr., ISSN 0352-9045, [http://www.midem-drustvo.si/Journal%20papers/MIDEM_46\(2016\)2p57.pdf](http://www.midem-drustvo.si/Journal%20papers/MIDEM_46(2016)2p57.pdf), <http://www.dlib.si/details/URN:NBN:SI:doc-0GDF02PQ>.
- Arpad Bürmen, Tadej Tuma, "Generating poll directions for mesh adaptive direct search with realizations of a uniformly distributed random orthogonal matrix", *Pacific journal of optimization*, Oct. 2016, vol. 12, no. 4, str. 813-832, ilustr., ISSN 1348-9151, <http://www.ybook.co.jp/online-p/PJO/Open/vol12/pjov12n4p813-oa/FLASH/index.html>.
- Arpad Bürmen, Jernej Olenšek, Tadej Tuma, "Mesh adaptive direct search with second directional derivative-based Hessian update", *Computational optimization and applications*, [Print ed.], Dec. 2015, vol. 62, no. 3, str. 693-715, ISSN 0926-6003, <http://link.springer.com/article/10.1007/s10589-015-9753-5>, DOI: [10.1007/s10589-015-9753-5](https://doi.org/10.1007/s10589-015-9753-5).
- Arpad Bürmen, Husni Habal, "Computing worst-case performance and yield of analog integrated circuits by means of mesh adaptive direct search = Določanje najslabših lastnosti in izplena analognih integriranih vezij z adaptivnim mrežnim direktnim optimizacijskim postopkom", *Informacije MIDEM : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], jun. 2015, letn. 45, št. 2, str. 160-170, ilustr., ISSN 0352-9045,

[http://www.midem-drustvo.si/Journal%20papers/MIDEM_45\(2015\)2p160.pdf](http://www.midem-drustvo.si/Journal%20papers/MIDEM_45(2015)2p160.pdf),
<http://www.dlib.si/details/URN:NBN:SI:doc-QJRKGUQB>.

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- Janez Puhan, Dušan Raič, Tadej Tuma, Arpad Bürmen, "Break-before-make CMOS inverter for power-efficient delay implementation", *The scientific world journal*, 2014, vol. 2014, str. 1-11, ilustr., ISSN 1537-744X, <http://dx.doi.org/10.1155/2014/349131>, DOI: [10.1155/2014/349131](https://doi.org/10.1155/2014/349131).
- Iztok Fajfar, Tadej Tuma, Janez Puhan, Jernej Olenšek, Arpad Bürmen, "Towards smaller populations in differential evolution = K majšim populacijam v diferencialni evoluciji", *Informacije MIDEM : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], sep. 2012, letn. 42, št. 3, str. 152-163, ilustr., ISSN 0352-9045, [http://www.midem-drustvo.si/Journal%20papers/MIDEM_42\(2012\)3p152.pdf](http://www.midem-drustvo.si/Journal%20papers/MIDEM_42(2012)3p152.pdf), <http://www.dlib.si/details/URN:NBN:SI:doc-ZFKAUZBL>.
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- Gregor Cijan, Tadej Tuma, Arpad Bürmen, "Direct search approach to integrated circuit sizing for high parametric yield", *IET circuits, devices & systems*, [Print ed.], 2011, vol. 5, no. 1, str. 37-45, ilustr., ISSN 1751-858X.
- Janez Puhan, Dušan Raič, Tadej Tuma, Sašo Tomažič, Arpad Bürmen, "Optimising digital circuit cells = Optimizacija gradnikov digitalnih vezij", *Informacije MIDEM : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], sep. 2010, letn. 40, št. 3, str. 167-173, ilustr., ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-NM7PUV7Q>.
- Janez Puhan, Arpad Bürmen, Tadej Tuma, Iztok Fajfar, "Teaching assembly and C language concurrently", *International journal of electrical engineering education*, [Print ed.], Apr. 2010, vol. 47, no. 2, str. 120-131, ilustr., ISSN 0020-7209.
- Gregor Cijan, Tadej Tuma, Sašo Tomažič, Arpad Bürmen, "Fast MOS transistor mismatch optimization - a comparison between different approaches = Hitra optimizacija neujemanja MOS tranzistorjev - primerjava različnih pristopov", *Informacije MIDEM : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], mar. 2009, letn. 39, št. 1, str. 1-6, ilustr., ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-CZQTP4HZ>.
- Iztok Fajfar, Tadej Tuma, Arpad Bürmen, Janez Puhan, "A top down approach to teaching embedded systems programming = Pristop k učenju programiranja vgrajenih sistemov z vrha navzdol", *Informacije MIDEM : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], mar. 2009, letn. 39, št. 1, str. 53-60, ilustr., ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-AIL27V7M>.
- Gregor Cijan, Tadej Tuma, Arpad Bürmen, "A direct search method for worst case analysis and yield optimization of integrated circuits", *Journal of circuits, systems, and computers*, 2009, vol. 18, no. 7, str. 1185-1204, ilustr., ISSN 0218-1266, DOI: [10.1142/S0218126609005617](https://doi.org/10.1142/S0218126609005617).
- Arpad Bürmen, Tadej Tuma, "Unconstrained derivative-free optimization by successive approximation", *Journal of computational and applied mathematics*, [Print ed.], Jan. 2009, vol. 223, no. 1, str. 62-74, ilustr., ISSN 0377-0427.
- Jernej Olenšek, Arpad Bürmen, Janez Puhan, Tadej Tuma, "DESA : a new hybrid global optimization method and its application to analog integrated circuit sizing", *Journal of global optimization*, May 2009, vol. 44, no. 1, str. 53-77, ilustr., ISSN 0925-5001.

- Arpad Bürmen, Tadej Tuma, Iztok Fajfar, "A combined simplex-trust-region method for analog circuit optimization", *Journal of circuits, systems, and computers*, 2008, vol. 17, no. 1, str. 123-140, ilustr., ISSN 0218-1266.
- Janez Puhan, Arpad Bürmen, Sašo Tomažič, Tadej Tuma, "Definicija kriterijske funkcije za robustno optimizacijo lastnosti operacijskega ojačevalnika = Cost function definition for robust optimisation of operational amplifier", *Informacije MIDE M : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], sep. 2007, letn. 37, št. 3, str. 189-194, ilustr., ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-3AGJ6I0M>.
- Arpad Bürmen, Tadej Tuma, "Sprouting search - an algorithmic framework for asynchronous parallel unconstrained optimization", *Optimization methods & software*, Print ed., Oct. 2007, vol. 22, no. 5, str. 755-776, ISSN 1055-6788.
- Arpad Bürmen, Janez Puhan, Tadej Tuma, "Grid restrained Nelder-Mead algorithm", *Computational optimization and applications*, [Print ed.], Jul. 2006, vol. 34, no. 3, str. 359-375, ISSN 0926-6003. [COBISS.SI-ID [5222996](https://www.dlib.si/details/URN:NBN:SI:doc-5222996)],
- Borut Wagner, Arpad Bürmen, Janez Puhan, Sašo Tomažič, Tadej Tuma, "Application of extrapolation algorithms in nonlinear circuit simulation and optimization with SPICE OPUS = Uporaba ekstrapolacijskih postopkov pri simulaciji in optimizaciji nelinearnih vezij s programskim paketom SPICE OPUS", *Informacije MIDE M : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], sep. 2006, letn. 36, št. 3, str. 140-147, ilustr., ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-Q3T0U22I>.
- Jernej Olenšek, Janez Puhan, Arpad Bürmen, Sašo Tomažič, Tadej Tuma, "Optimization of integrated circuits by means of simulated annealing = Optimizacija integriranih vezij z algoritmom simuliranega ohlajanja", *Informacije MIDE M : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], jun. 2006, letn. 36, št. 2, str. 79-84, ilustr., ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-384QO8C1>.
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- Arpad Bürmen, Janez Puhan, Tadej Tuma, "Parallel sizing of robust analog ICs = Vzporedno dimenzioniranje robustnih analognih integriranih vezij", *Informacije MIDE M : časopis za mikroelektroniko, elektronske sestavne dele in materiale*, [Tiskana izd.], 2004, letn. 34, št. 2, str. 88-94, ISSN 0352-9045, <http://www.dlib.si/details/URN:NBN:SI:doc-FW2FP470>.
- Arpad Bürmen, Drago Strle, Franc Bratkovič, Janez Puhan, Iztok Fajfar, Tadej Tuma, "Automated robust design and optimization of integrated circuits by means of penalty functions", *AEÜ : international journal of electronics and communications*, [Print ed.], 2003, 57, no. 1, str. 47-56, ilustr., ISSN 1434-8411.
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Books

- Tadej Tuma, Arpad Bürmen, *Circuit simulation with SPICE OPUS : theory and practice*, Boston; Basel; Berlin: Birkhäuser, cop. 2009, XVI, 399 str., ilustr., Modeling and simulation in science, engineering and technology, ISBN 978-0-8176-4866-4, ISBN 0-8176-4866-6, ISBN 0-8176-4867-4, ISBN 978-0-8176-4867-1, DOI: [10.1007/978-0-8176-4867-1](https://doi.org/10.1007/978-0-8176-4867-1).