

List of publications

Theses

- M. Béreš: [Methods for the solution of differential equations with uncertainties in parameters](#). Doctoral Thesis, supervisor R. Briš. *Technical University of Ostrava, Faculty of Electrical Engineering and Computer Science*, 2023.
- M. Béreš: [Cross-entropy method as a tool for solution of optimization problems](#). Master's Thesis, supervisor R. Briš. *Technical University of Ostrava, Faculty of Electrical Engineering and Computer Science*, 2015.
- M. Béreš: [Monte Carlo Method as a Tool for Solving Engineering Problems](#). Bachelor's Thesis, supervisor R. Briš. *Technical University of Ostrava, Faculty of Electrical Engineering and Computer Science*, 2013.

Journal articles

- J. Karátson, S. Sysala, M. Béreš: [Quasi-Newton iterative solution approaches for nonsmooth elliptic operators with applications to elasto-plasticity](#), submitted revision, 2024.
 - J. Stebel, J. Kružík, D. Horák, J. Březina, M. Béreš: [On the parallel solution of hydro-mechanical problems with fracture networks and contact conditions](#). *Computers & Structures*, volume 298, 2024, article 107339.
 - J. Karátson, S. Sysala, M. Béreš: [Quasi-Newton variable preconditioning for nonlinear elasticity systems in 3D](#). *Numerical Linear Algebra with Applications*, volume 31, issue 3, 2024, article NLA.2537.
 - O. Axelsson, M. Béreš, R. Blaheta: [Computational methods for boundary optimal control and identification problems](#). *Mathematics and Computers in Simulation*, volume 189, 2021, pages 276-290.
 - R. Blaheta, M. Béreš, S. Domesová, D. Horák: [Bayesian inversion for steady flow in fractured porous media with contact on fractures and hydro-mechanical coupling](#). *Computational Geosciences*, volume 24, 2020, pages 1911-1932.
 - M. Béreš: [A comparison of approaches for the construction of reduced basis for stochastic Galerkin matrix equations](#). *Applications of Mathematics*, volume 65, issue 2, 2020, pages 191-225.
 - R. Blaheta, M. Béreš, S. Domesová, P. Pan: [A comparison of deterministic and Bayesian inverse with application in micromechanics](#). *Applications of Mathematics*, volume 63, issue 6, 2018, pages 665-686.
 - M. Béreš, S. Domesová: [The stochastic galerkin method for darcy flow problem with log-normal random field coefficients](#). *Advances in Electrical and Electronic Engineering*, volume 15, issue 2, 2017.
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- S. Domesová, M. Béréš: [Solution of inverse problems using bayesian approach with application to estimation of material parameters in darcy flow](#). *Advances in Electrical and Electronic Engineering*, volume 15, issue 2, 2017.

Conference papers

- M. Béréš: [Efficient Solution of Stochastic Galerkin Matrix Equations via Reduced Basis and Tensor Train Approximation](#). In I. Lirkov, S. Margenov (eds.): *LSSC 2023, Lecture Notes in Computer Science*, volume 13952, 2024, pages 205-214.
- M. Béréš, R. Blaheta, S. Domesová, D. Horák: [Numerical Methods for Simulation of Coupled Hydro-Mechanical Processes in Fractured Porous Media](#). *Lecture Notes in Civil Engineering*, volume 125, Springer, 2021, pages 591-599.
- S. Domesová, M. Béréš, R. Blaheta: [Efficient Implementation of the Bayesian Inversion by MCMC with Acceleration of Posterior Sampling Using Surrogate Models](#). *Lecture Notes in Civil Engineering*, volume 125, Springer, 2021, pages 846-853.
- M. Béréš: [An efficient reduced basis construction for stochastic galerkin matrix equations using deflated conjugate gradients](#). *Lecture Notes in Electrical Engineering*, volume 554, Springer, 2020, pages 175-184.
- M. Béréš: [Karhunen-Loève decomposition of isotropic Gaussian random fields using a tensor approximation of autocovariance kernel](#). *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, volume 11087, Springer, 2018, pages 188-202.
- S. Domesová, M. Béréš: [A Bayesian approach to the identification problem with given material interfaces in the darcy flow](#). *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, volume 11087, Springer, 2018, pages 203-216.
- M. Béréš, R. Briš: [Acceleration of multi-factor Merton model monte carlo simulation via importance sampling and GPU parallelization](#). *Applied Mathematics in Engineering and Reliability - Proceedings of the 1st International Conference on Applied Mathematics in Engineering and Reliability, ICAMER 2016*, 2016.
- R. Blaheta, M. Béréš, S. Domesová: [A study of stochastic FEM method for porous media flow problem](#). *Applied Mathematics in Engineering and Reliability - Proceedings of the 1st International Conference on Applied Mathematics in Engineering and Reliability, ICAMER 2016*, 2016.

Technical reports:

- J. Březina, S. Sysala, J. Stebel, **M. Běreš**, S. Běrešová, P. Exner, D. Horák, J. Kružík, T. Luber: [Posouzení vlivu EDZ na transport radioaktivních látek a bezpečnost hlubinného úložiště radioaktivního odpadu pomocí výpočetních metod](#). Necertifikovaná metodika pro TAČR ENDORSE projekt č. TK02010118, 2023 (in Czech).

Software and codes

- https://github.com/Beremi/nonlinear_energies_python - Minimization of non-linear energies using FEM and automatic differentiation tools.
 - <https://github.com/Beremi/CameraPoseEstimation> - Estimating robotic arm position using camera (optimization and Neural Nets).
 - <https://gitlab.com/michal.beres0/tefem> - Minimal tool for the assembly of FEM problems in MATLAB.
 - <https://gitlab.com/michal.beres0/sgmm> - Companion codes for dissertation thesis (stochastic Galerkin methods, Tensor-Train methods, iterative solvers).
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