

## LIST OF PUBLICATIONS

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#### A. Peer-reviewed scientific articles

##### A1. Journal articles

- [1] Hirvi P, Kuutela T, Fang Q, Hannukainen A, Hyvönen N, Nissilä I. Effects of atlas-based anatomy on modelled light transport in the neonatal head. *Phys Med Biol.* 2023 68(13), 2023
- [2] X. Ren, A. Thabuis, R. Corcolle, A. Hannukainen and Y. Perriard. Level-Set-Based Shape Optimization on Soft Magnetic Composites With Isotropy Constraint. in *IEEE Transactions on Magnetics* 58(9), p. 1-4, 2022
- [3] A. Hannukainen, J. Malinen and A. Ojalammii, Distributed solution of Laplacian eigenvalue problems, *SIAM Journal on numerical analysis* 60(1). p. 76-103, 2022
- [4] S. Armstrong, A. Hannukainen, T. Kuusi and J-C. Mourrat, An iterative method for elliptic problems with rapidly oscillating coefficients, *ESAIM: Mathematical Modelling and Numerical Analysis* 55(1), p. 37-55, 2021
- [5] A. Hannukainen, N. Hyvönen, and L. Perkkiö, Inverse heat source problem and experimental design for determining iron loss distribution, *SIAM Journal on Scientific Computing*, 43, p. 243-270, 2021.
- [6] A. Hannukainen, J-C Mourrat and H. Stoppels, Computing homogenized coefficients via multiscale representation and hierarchical hybrid grids, *ESAIM: M2AN*, 55, p.149-185, 2021
- [7] X. Ren, A. Hannukainen, A. Belahcen and Y. Perriard, LOD Homogenization of Multiscale Eddy Current Problem in Time Domain, *IEEE Transactions on Magnetics*, 57(6), p. 1-4, 2021
- [8] X. Ren, A. Thabuis, A. Hannukainen and Y. Perriard, Shape Optimization of Soft Magnetic Composites Using Level-Set Method, *IEEE Transactions on Magnetics*, 57(5), pp. 1-8, 2021
- [9] T. Häkkinen, S. Sova, I. Corfe , L. Tjäderhane , A. Hannukainen and J. Jernvall, Modeling enamel matrix secretion in mammalian teeth, *PLoS Computational Biology*, 15(5), 2019
- [10] A. Hannukainen, J. Malinen and A. Ojalammii, Efficient Solution of Symmetric Eigenvalue Problems from Families of Coupled Systems, *SIAM Journal on Numerical Analysis*, 57(4), 1789–1814, 2019

- [11] V. Candiani, A. Hannukainen and N. Hyvönen, Computational Framework for Applying Electrical Impedance Tomography to Head Imaging, *SIAM Journal on Scientific Computing*, 41(5), B1034–B1060, 2019
- [12] X. Ren, A. Hannukainen and A. Belachen, Homogenization of multiscale eddy current problem by localized orthogonal decomposition method, *IEEE Transactions on Magnetics*, 55(9), 1-4, 2019
- [13] A. Hannukainen, N. Hyvönen, and L. Mustonen, An inverse boundary value problem for the p-Laplacian: A linearization approach, *Inverse Problems*, 35(3), 2018
- [14] R. Sundaria, A. Lehtikoinen, A. Hannukainen, A. Arkkio, A. Belachen, Mixed-Order Finite-Element Modeling of Magnetic Material Degradation Due to Cutting, *IEEE Transactions on Magnetics*, 54(6), 1–8, 2018
- [15] L. Perkkiö, B. Upadhaya, A. Hannukainen and P. Rasilo, Stable Adaptive Method to Solve FEM Coupled With Jiles-Atherton Hysteresis Model, *IEEE Transactions on Magnetics*, 54(2), 1–8, 2018
- [16] A. Hannukainen, J. Kuortti, J. Malinen, A. Ojalampi, An acoustic glottal source for vocal tract physical models, *Measurement Science and Technology* 28(11), 1–16, 2017
- [17] A. Hannukainen, S. Korotov, M. Křížek, On Synge-type angle condition for  $d$ -simplices, *Applications of Mathematics* 62(1), 1–13, 2017
- [18] A. Hannukainen, N. Hyvönen, H. Majander, and T. Tarvainen, Efficient inclusion of total variation type priors in quantitative photoacoustic tomography, *SIAM J. Imaging Sci.*, 9(3), 1132–1153, 2016
- [19] L. Perkkiö, B. Silwal, P. Rasilo, A. Hannukainen, T. Eirola, A. Arkkio, et al., Energy Preserving Methods and Torque Computation From Energy Balance in Electrical Machine Simulations, *IEEE Transactions on Magnetics*, 52(8), 1–8, 2016
- [20] B. Silwal, P. Rasilo, L. Perkkiö, A. Hannukainen, T. Eirola, A. Arkkio, Numerical analysis of the power balance of an electrical machine with rotor eccentricity. *IEEE Transactions on Magnetics*, 52(3), 1–4, 2016
- [21] A. Hannukainen, L. Harhanen, N. Hyvönen, H. Majander, Edge-promoting reconstruction of absorption and diffusivity in optical tomography, *Inverse Problems* 32(1), 1–18, 2015
- [22] B. Silwal, P. Rasilo, L. Perkkiö, M. Oksman, A. Hannukainen, T. Eirola, A. Arkkio, Computation of torque of an electrical machine with different types of finite element mesh in the air gap. *IEEE Transactions on Magnetics*, 50(12), 1–9, 2014
- [23] A. Huhtala, S. Bossuyt, A. Hannukainen, A priori error estimate of the finite element solution to a Poisson inverse source problem, *Inverse Problems*, 30(8), 2014
- [24] P. Rasilo, L. Perkkiö, A. Hannukainen, B. Silwal, T. Eirola, A. Arkkio, Instantaneous Power Balance in Finite-Element Simulation of Electrical Machines, *IEEE Transactions on Magnetics*, 50(5), 1–7, 2014
- [25] K. Hollaus, A. Hannukainen, J. Schöberl, Two-Scale Homogenization of the Nonlinear Eddy Current Problem with FEM, *IEEE Transactions on Magnetics*, 50(2), 413–416, 2014
- [26] A. Hannukainen, S. Korotov, M. Křížek, On numerical regularity of the face-to-face longest-edge bisection algorithm for tetrahedral partitions. *Sci. of Comp. Prog.*, 90(A), 34–41, 2014

- [27] J. Dardé , A. Hannukainen, N. Hyvönen, An  $H(\text{div})$ -based mixed quasi-reversibility method for solving elliptic Cauchy problems, *SIAM Journal on Numerical Analysis*, 51(4), 212–2148, 2013.
- [28] A. Hannukainen, Field of values analysis of a two-level preconditioner for the Helmholtz equation, *SIAM Journal on Numerical Analysis*, 51(3), 1567-1584, 2013
- [29] A. Hannukainen, M. Vohralik, R. Stenberg, A unified framework for a posteriori error estimation for the Stokes problem, *Numerische Mathematik*, 122(4), 725–769, 2012
- [30] A. Hannukainen, S. Korotov, M. Křížek, The maximum angle condition is not necessary for convergence of the finite element method, *Numerische Mathematik*, 120(1), 79–88, 2012
- [31] A. Hannukainen, Continuous preconditioners for the mixed Poisson problem, *BIT*, 52(1), 65–85, 2012
- [32] Brandts J., Hannukainen A., Korotov S., Krizek M. On angle conditions in the finite element method *SeMA Journal* 56 (2011) 81-95
- [33] A. Hannukainen, M. Juntunen, R. Stenberg, Computations with finite element methods for the Brinkman problem, *Computational Geosciences*, 15(1), 155–166, 2011
- [34] A. Hannukainen, S. Korotov, M. Křížek. On global and local mesh refinements by a generalized conforming bisection algorithm, *J. Comput. Appl. Math.*, 235(2), 419-436, 2010
- [35] T. Vejchodský, A. Hannukainen, S. Korotov. Discrete maximum principle for parabolic problems solved by prismatic finite elements., *Math. Comput. Simul.* 80(8), 1758-1770, 2010
- [36] A. Hannukainen, M. Huber, J. Schöberl. A mixed hybrid finite element method for the Helmholtz equation, *Journal of Modern Optics*, 58(5-6), 424–437, 2010
- [37] A. Hannukainen, S. Korotov, M. Rüter. A posteriori error estimates for some problems in Linear Elasticity, *Computing Letters*, 4, 61–72, 2008
- [38] D. Kuzmin, A. Hannukainen, S. Korotov. A new a posteriori error estimates for convection-reaction-diffusion problem. *J. Comput. Appl. Math.* 218(1), 70–78, 2008
- [39] A. Hannukainen, S. Korotov, T. Vejchodský. Discrete maximum principle for 3D-FE solutions of the diffusion-reaction problem on prismatic meshes, *J. Comput. Appl. Math.* 226(2), 275–287, 2008
- [40] A. Hannukainen and S. Korotov. Computational Technologies for Reliable Control of Global and Local errors for Linear Elliptic Type Boundary Value Problems, *J. Numer. Anal. Indust. Appl. Math.*, 2(3-4), 157–176, 2007
- [41] A. Hannukainen, T. Lukkari, J. Malinen, P. Palo. Vowel formants from the wave equation *J. Acous. Soc. Amer. Express Letters*, 122(1), EL1-EL7, 2007
- [42] A. Hannukainen, S. Korotov. Techniques for A Posteriori Error Estimation in Terms of Linear Functionals for Elliptic Type Boundary Value Problems, *Far East J. Appl. Math.*, 21(3), 289-304, 2005

#### A4. Conference proceedings

- [43] A. Hannukainen. Functional type a posteriori error estimates for Maxwell’s equations. *Proceedings of ENUMATH 2007, the 7th European Conference on Numerical Mathematics and Advanced Applications*, 41-48, 2008

- [44] A. Hannukainen, S. Korotov. Two-Sided A Posteriori Estimates of Global and Local Errors for Linear Elliptic Type Boundary Value Problems. Proceedings of PANM13 (Programs and Algorithms 13), 92-103, 2007

## B. Non-refereed scientific articles

- [45] A. Arkkio, A. Hannukainen, A. Niemenmaa, Power balance for verifying torque computation within time-discretized finite-element analysis. Electromagnetic Phenomena in Nonlinear Circuits, Dortmund, Germany, June 29 - July 2, 2010. Poznan, Poland 2010, PTETiS Publishers, 23-24
- [46] T. Vejchodský, A. Hannukainen, S. Korotov, On Weakening Conditions for Discrete Maximum Principles for Linear Finite Element Schemes, Proceedings of Numerical Analysis and Its Applications: 4th International Conference, 297-307, 2009
- [47] A. Hannukainen, S. Korotov, M. Křížek. Nodal  $O(h^4)$ -superconvergence of piecewise trilinear FE approximations. Proceedings of APLIMATH 2008, 347–350, 2008
- [48] A. Belahcen, K. Fonteyn, A. Hannukainen, R. Kouhia, On numerical modeling of coupled magnetoelastic problem , Proceedings of the 21st Nordic Seminar on Computational Mechanics Trondheim, 203-206, 2008
- [49] A. Hannukainen. A Posteriori Error Control in Terms of Linear Functionals For Elliptic Problems : Estimation and Mesh Adaptivity, Proceedings of the IX Finnish Mechanics Days, 452-463, 2006
- [50] A. Hannukainen, T. Lukkari, J. Malinen, P. Palo: Formants and vowel sounds by the Finite Element Method. Proceedings of the Phonetics Symposium 2006, 24-33, 2006
- [51] A. Hannukainen and S. Korotov. On two-sided a posteriori estimates of computational errors for linear elliptic type boundary value problems, Proc. Internat. Conf. of Numerical Analysis and Applied Mathematics (ICNAAM-2005), 222-225, 2005
- [52] A.Hannukainen and S.Korotov. New Computational Technologies for Reliable Computer Simulation: Ideas and Implementation, SIMS 2005 46th Conference on Simulation and Modeling, 91-97, 2005

## D Publications intended for professional communities

- [53] A. Hannukainen, Field of values analysis of preconditioners for the Helmholtz equation in lossy media, arXiv:1106.0424v1, 2011
- [54] A. Hannukainen, Convergence analysis of GMRES for the Helmholtz equation via pseudospectrum, arXiv:1505.08072 , 2015

## G Thesis

### G5 Doctoral dissertation (article)

- [55] A. Hannukainen, [Finite Element Methods for Time-Harmonic Wave Equations](#), ISBN 978-952-60-4296-1