

1 List of publications (1996-2022)

1.1 Monographs

- [1] B. Kaltenbacher, T. Schuster and A. Wald (Eds.). Time-dependent problems in Imaging and Parameter Identification. Springer, Heidelberg, 2021.
- [2] U. Gabbert, R. Lammering, T. Schuster, M. Sinapius, and P. Wierach. Lamb-Wave Based Structural Health Monitoring in Polymer Composites. In *Research Topics in Aerospace*, Springer, Heidelberg, 2018.
- [3] B. Littau, J. Tepe, G. Schober, S. Kremling, T. Hochrein, P. Heidemeyer, T. Schuster, and M. Bastian. *Entwicklung und Evaluierung der Potenziale von Terahertz-Tomografie-Systemen*. SKZ - Das Kunststoffzentrum (Hrsg.), Shaker Verlag, Aachen, 2016.
- [4] T. Schuster, B. Kaltenbacher, B. Hofmann, and K. Kazimierski. *Regularization Methods in Banach Spaces*. In Radon Series on Computational and Applied Mathematics, deGruyter, Berlin, 2012.
- [5] T. Schuster. *The Method of Approximate Inverse: Theory and Applications*. In Lecture Notes in Mathematics, vol. 1906, Springer, Berlin-Heidelberg-NewYork, 2007.

1.2 Contributions to monographs

- [1] R. Klein, T. Schuster and A. Wald. Sequential subspace optimization for recovering stored energy functions in hyperelastic materials from time-dependent data. *Time-dependent problems in Imaging and Parameter Identification*, B. Kaltenbacher, T. Schuster, A. Wald (Eds.), Springer, 2021.
- [2] B. Kaltenbacher, T.T.N. Nguyen, A. Wald and T. Schuster. Parameter identification for the Landau-Lifshitz-Gilbert equation in Magnetic Particle Imaging. *Time-dependent problems in Imaging and Parameter Identification*, B. Kaltenbacher, T. Schuster, A. Wald (Eds.), Springer, 2021.
- [3] E.Y. Derevtsov, Y.S. Volkov and T. Schuster. Integral operators at settings and investigations of tensor tomography problems. *Continuum Mechanics, Applied Mathematics and Scientific Computing: Godunov's Legacy*, G.V. Demidenko, E. Romenski, E. Toro, M. Dumbser (Eds.), Springer, 2020.
- [4] T. Schuster. The importance of the Radon transform in vector field tomography. In *The first 100 years of the Radon Transform*, R. Ramlau, O. Scherzer (Eds.), Springer, 2019.

- [5] A. Wald and T. Schuster. Tomographic terahertz imaging using sequential subspace optimization. In *Trends in Parameter Identification for Mathematical Models*, B. Hofmann, A. Leitao, J. Zubelli (Eds.), Birkhäuser / Springer, 2018.
- [6] N. Kong, A. Sanders, M. Rösner, R. Friedrich, F. Dirksen, E. Bauma, T. Schuster, R. Lammering and J.P. Wulfsberg. Functional integrated feed-units based on flexible mechanisms in small machine tools for small workpieces. In *Small Machine Tools for Small Workpieces*, J.P. Wulfsberg, A. Sanders (Eds.), Series: Lecture Notes in Production Engineering, Springer, 2017.
- [7] T. Schuster. 20 Years of imaging in vector field tomography: a review. In *Mathematical Methods in Biomedical Imaging and Intensity-Modulated Radiation Therapy (IMRT)*, Y. Censor, M. Jiang, A. K. Louis (Eds.), Series: Publications of the Scuola Normale Superiore, CRM Series , Vol. 7, Birkhäuser, 2008.

1.3 Articles in journals with peer review

- [1] C. Meiser, A. Wald and T. Schuster. Learned anomaly detection with terahertz radiation in inline process monitoring. *Sensing and Imaging*, 23:30, 2022.
- [2] L. Vierus and T. Schuster. Well-defined forward operators in dynamic diffractive tensor tomography using viscosity solutions of transport equations. *Electronic Transactions on Numerical Analysis*, 57:80-100, 2022.
- [3] R. Rothermel, W. Panfilenko, P. Sharma, A. Wald, T. Schuster, A. Jung and S. Diebels. A method for determining the parameters in a rheological model for viscoelastic materials by minimizing Tikhonov functionals. *Applied Mathematics in Science and Engineering*, 30(1):141-165, 2022.
- [4] D. Rothermel, T. Schuster, R. Schorr and M. Peglow. Determination of the temperature-dependent thermal material properties in the cooling process of steel plates. *Mathematical Problems in Engineering*, DOI:10.1155/2021/6653388, Article ID 6653388, 2021.
- [5] D. Rothermel and T. Schuster. Solving an inverse heat convection problem with an implicit forward operator by using a projected quasi-Newton method. *Inverse Problems*, 37(4):36pp, 2021.
- [6] S.E. Blanke, B.N. Hahn and A. Wald. Inverse problems with inexact forward operator: iterative regularization and application in dynamic imaging. *Inverse Problems*, 36(12):36pp, 2020.

- [7] E.Y. Derevtsov, Y.S. Volkov and T. Schuster. Generalized attenuated ray transforms and their integral angular moments. *Applied Mathematics and Computation*, Article ID 125494, 2020.
- [8] F. Heber, F. Schöpfer, and T. Schuster. Acceleration of sequential subspace optimization in Banach spaces by orthogonal search directions. *J. Comp. Appl. Math.*, 345:1-22, 2019.
- [9] A. Wald. A fast subspace optimization method for nonlinear inverse problems in Banach spaces with an application in parameter identification. *Inverse Problems*, 34(8):27pp, 2018.
- [10] S. Diebels, T. Schuster and A. Wewior. Identifying elastic and viscoelastic material parameters by Tikhonov regularization. *Mathematical Problems in Engineering*, DOI:10.1155/2018/1895208, Article ID 1895208, 2018.
- [11] J. Seydel and T. Schuster. Identifying the stored energy of a hyperelastic structure from surface measurements by using an attenuated Landweber method. *Inverse Problems*, Special Issue: Dynamic Inverse Problems, 33(12):31pp, DOI:10.1088/1361-6420/aa8d91, 2017.
- [12] A. Katsevich, D. Rothermel, and T. Schuster. An improved exact inversion formula for solenoidal fields in cone beam vector tomography. *Inverse Problems*, 33(6):19pp, Special issue: 100 Years of the Radon transform, DOI:10.1088/1361-6420/aa58d5, 2017.
- [13] C. Schorr, L. Dörr, M. Maisl and T. Schuster. Registration of a priori information for computed laminography. *NDT&E International*, 86:106-112, 2017
- [14] A. Wald and T. Schuster. Sequential subspace optimization for nonlinear inverse problems. *J. Inv. Ill-Posed Prob.*, 25(1), DOI:10.1515/jiip-2016-0014, 2017.
- [15] J. Tepe and T. Schuster. A modified algebraic reconstruction technique taking refraction into account with an application in terahertz tomography. *Inverse Problems in Science and Engineering*, 25:1448-1473, DOI:10.1080/17415977.2016.1267168, 2017.
- [16] U. Schröder and T. Schuster. A numerical algorithm to determine the refractive index of an inhomogeneous medium from time-of-flight measurements, *Inverse Problems*, 32(8):35pp, DOI:10.1088/0266-5611/32/8/085009, 2016.
- [17] J. Seydel and T. Schuster. On the linearization of identifying the stored energy function of a hyperelastic material from full knowledge of the displacement field, *Math. Meth. Appl. Sci.*, 40(1):183-204, DOI: 10.1002/mma.3979, 2016.

- [18] F. Binder, F. Schöpfer and T. Schuster. PDE-based defect localization in fibre-reinforced composites from surface sensor measurements. *Inverse Problems*, 31(2):22pp, DOI:10.1088/0266-5611/31/2/025006, 2015.
- [19] A. Wöstehoff and T. Schuster. Uniqueness and stability result for Cauchy's equation of motion for a certain class of hyperelastic materials. *Applicable Analysis*, 94(8):1561-1593, 2015.
- [20] T. Schuster and A. Wöstehoff. On the identifiability of the stored energy function of hyperelastic materials from sensor data at the boundary. *Inverse Problems*, 30(10):26pp, DOI:10.1088/0266-5611/30/10/105002, 2014.
- [21] E.Y. Derevtsov, I.E. Svetov, Y.S. Volkov, and T. Schuster. A numerical solver based on B-splines for 2D vector field tomography in a refracting medium. *Mathematics and Computers in Simulation*, 97:207-223, 2014.
- [22] D. Kern, M. Rösner, E. Bauma, W. Seemann, R. Lammering and T. Schuster. Key features of flexure hinges used as rotational joints. *Forschung im Ingenieurwesen*, DOI:10.1007/s10010-013-0169-z, 2013.
- [23] A. Katsevich and T. Schuster. An exact inversion formula for cone beam vector tomography. *Inverse Problems*, 29(6):13pp, 2013.
- [24] J.P. Wulfsberg, R. Lammering, T. Schuster, N. Kong, M. Rösner, E. Bauma, and R. Friedrich. A novel methodology for the development of compliant mechanisms with application to feed units. *Production Engineering*, DOI:10.1007/s11740-013-0472-4, 2013.
- [25] F. Schöpfer, F. Binder, A. Wöstehoff, T. Schuster, S.v. Ende, S. Föll, and R. Lammering. Accurate determination of dispersion curves of guided waves in plates by applying the matrix pencil method to laser vibrometer measurement data. *CEAS Aeronautical Journal*, Article ID 10.1007/s13272-012-0055-7, 2013.
- [26] T. Schuster, A. Rieder, and F. Schöpfer. The approximate inverse in action IV: semi-discrete equations in a Banach space setting. *Inverse Problems*, 28:19pp, 2012.
- [27] E.Y. Derevtsov, A. Efimov, A.K. Louis, and T. Schuster. Singular value decomposition and its application to numerical inversion for ray transforms in 2D vector tomography. *J. Inv. Ill-Posed Prob.*, 19:689-715, 2011.
- [28] S. Kazantsev and T. Schuster. Asymptotic inversion formulas in 3D vector field tomography for different geometries. *J. Inv. Ill-Posed Prob.*, 19:769-799, 2011.

- [29] E.T. Quinto, A. Rieder, and T. Schuster. Local inversion of the sonar transform regularized by the approximate inverse. *Inverse Problems*, 27:18pp, 2011.
- [30] T. Pfitzenreiter, and T. Schuster. Tomographic reconstruction of the curl and divergence of 2D vector fields taking refractions into account. *SIAM J. on Imaging Sci.*, 4:40-56, 2011.
- [31] F. Schöpfer, F. Binder, A. Wöstehoff, and T. Schuster. A mathematical analysis of the strip element method for the computation of dispersion curves of guided waves in anisotropic layered media. *Mathematical Problems in Engineering*, Article ID 924504, 17 pp, 2010.
- [32] T. Schuster and F. Schöpfer. Solving linear operator equations in Banach spaces non-iteratively by the method of approximate inverse. *Inverse Problems*, 26(8):19pp, 2010.
- [33] B. Kaltenbacher, F. Schöpfer, and T. Schuster. Iterative methods for non-linear ill-posed problems in Banach spaces: convergence and applications to parameter identification problems. *Inverse Problems*, 25(6):19pp, 2009.
- [34] T. Schuster, D. Theis, and A.K. Louis. A reconstruction approach for imaging in 3D cone beam vector field tomography. *Int. J. Biomed. Imag.*, Article ID 174283, 17 pages, DOI: 10.1155/2008/174283, 2009.
- [35] F. Schöpfer and T. Schuster. Fast regularizing sequential subspace optimization in Banach spaces. *Inverse Problems*, 25(1):22p, 2009.
- [36] E. Derevtsov, V. Pickalov, and T. Schuster. Application of local operators for numerical reconstruction of the singular support of a vector field by its known ray transforms. *Journal of Physics: Conference Series*, IOP Publishing, Vol. 135, Article ID 012035, 2008.
- [37] F. Schöpfer, T. Schuster, and A.K. Louis. Metric and Bregman projections onto affine subspaces and their computation via sequential subspace optimization methods. *J. Inv. Ill-Posed Prob.*, 16(5):479-506, 2008.
- [38] F. Schöpfer, T. Schuster, and A.K. Louis. An iterative regularization method for the solution of the split feasibility problem in Banach spaces. *Inverse Problems*, 24(5):20pp, 2008.
- [39] T. Bonesky, K. Kazimierski, P. Maass, F. Schöpfer, and T. Schuster. Minimization of Tikhonov functionals in Banach spaces. *Journal of Abstract and Applied Analysis*, Article ID 192679, 19 pages, 2007.

- [40] T. Schuster and J. Weickert. On the application of projection methods for computing optical flow fields. *Inverse Problems and Imaging*, 1(4):673–690, 2007.
- [41] T. Schuster. The formula of Grangeat for tensor fields of arbitrary order in n dimensions. *Int. J. Biomed. Imag.*, Article ID 12839, 4 pages, DOI: 10.1155/2007/12839, 2007.
- [42] E. Derevtsov, S. Kazantsev, and T. Schuster. Polynomial bases for subspaces of potential and solenoidal vector fields in the unit ball of R^3 . *J. Inv. Ill-Posed Prob.*, 15(1):19–55, 2007.
- [43] F. Schöpfer, A.K. Louis, and T. Schuster. Nonlinear iterative methods for linear ill-posed problems in Banach spaces. *Inverse Problems*, 22(1):311–329, 2006.
- [44] T. Schuster. Error estimates for defect correction methods in Doppler tomography. *J. Inv. Ill-Posed Prob.*, 14:83–106, 2006.
- [45] M. Haltmeier, T. Schuster, and O. Scherzer. Filtered backprojection for thermoacoustic computed tomography in spherical geometry. *Math. Meth. Appl. Sci.*, 28:1919–1937, 2005.
- [46] T. Schuster and E.T. Quinto. On a regularization scheme for linear operators in distribution spaces with an application to the spherical Radon transform. *SIAM J. Appl. Math.*, 65:1369–1387, 2005.
- [47] T. Schuster. Defect correction in vector field tomography: detecting the potential part using BEM and implementation of the method. *Inverse Problems*, 21:75–91, 2005.
- [48] E. Derevtsov, A.K. Louis, and T. Schuster. Two approaches to the problem of defect correction in vector field tomography solving boundary value problems. *J. Inv. Ill-Posed Prob.*, 12:597–626, 2004.
- [49] A. Rieder and T. Schuster. The approximate inverse in action III: 3D-Doppler tomography. *Num. Math.*, 97:353–378, 2004.
- [50] T. Schuster, J. Plöger, and A.K. Louis. Depth resolved residual stress evaluation from X-ray diffraction measurement data using the approximate inverse method. *Zeitschrift fuer Metallkunde*, 94:934–937, 2003.
- [51] T. Schuster. A stable inversion scheme for the Laplace operator using arbitrarily distributed data scanning points. *J. Inv. Ill-Posed Prob.*, 11:263–287, 2003.

- [52] A. Rieder and T. Schuster. The approximate inverse in action II: convergence and stability. *Math. of Comp.*, 72:1399–1415, 2003.
- [53] T. Schuster. An efficient mollifier method for 3D vector tomography: convergence analysis and implementation. *Inverse Problems*, 17:739–766, 2001.
- [54] T. Schuster. The 3D Doppler transform: elementary properties and computation of reconstruction kernels. *Inverse Problems*, 16(3):701–723, 2000.
- [55] A. Rieder, R. Dietz, and T. Schuster. Approximate inverse meets local tomography. *Math. Meth. Appl. Sci.*, 23(15):1373–1387, 2000.
- [56] E. Derevtsov, R. Dietz, T. Schuster, and A.K. Louis. Influence of refraction to the accuracy of a solution for the 2D-emission tomography problem. *J. Inv. Ill-Posed Prob.*, 8(2):161–191, 2000.
- [57] A. Rieder and T. Schuster. The approximate inverse in action with an application to computerized tomography. *SIAM J. Num. Anal.*, 37(6):1909–1929, 2000.
- [58] A.K. Louis and T. Schuster. A novel filter design technique in 2D computerized tomography. *Inverse Problems*, 12:685–696, 1996.

1.4 Articles in proceedings

- [1] C. Meiser, T. Schuster and A. Wald. A classification algorithm for anomaly detection in terahertz tomography. In *International Conference on Large-Scale Scientific Computing*, Springer, pp. 393-401, 2021.
- [2] A.K. Louis, S.V. Maltseva, A.P. Polyakova, T. Schuster and I.E. Svetov. On solving the slice-by-slice three-dimensional 2-tensor tomography problems using the approximate inverse method. *J. Phys.: Conf. Ser.*, 1715, DOI:10.1088/1742-6596/1715/1/012036 , Article ID 012036, 2021.
- [3] E.Y. Derevtsov, Y.S. Volkov and T. Schuster. Differential equations and uniqueness theorems for the generalized attenuated ray transforms of tensor fields. *Proceedings of the 3rd International Conference on Numerical Computations: Theory and Algorithms (NUMTA)*, Le Castella Village, Italy, 2019.
- [4] B. Littau, J. Tepe, S. Kremling, T. Schuster, T. Hochrein and P. Heidemeyer. Tomografische Bildgebung mit vollelektronischen Terahertz-Systemen zur Prüfung von Kunststoff-Bauteilen. *DACH-Jahrestagung 2015*, 2015.
- [5] E. Bauma and T. Schuster. A novel hybrid method for optimal control problems and its application to trajectory optimization in micro manufacturing.

Proceedings of the 4th International Conference on Engineering Optimization, Instituto Superior Tecnico, Lisbon, 8-11 September 2014, 2014.

- [6] E. Bauma and T. Schuster. A hybrid approach to optimization of trajectories in micro manufacturing. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, 14, 2014.
- [7] E. Derevtsov, I. Svetov, Y. Volkov, and T. Schuster. Numerical B-spline solution of 2D emission and vector tomography problems for media with absorption and refraction. *IEEE Proceedings 2008 Region 8 International Conference on Computational Technologies in Electrical and Electronics Engineering SIBIRCON-08*, Novosibirsk Scientific Center, Novosibirsk, Russia, July 21–25, pp. 212–217, 2008.
- [8] T. Schuster. Advances and challenges in vector field tomography. *Report Nr. 34/2006 des Workshops Mathematical Methods in Tomography*, Mathematisches Forschungsinstitut Oberwolfach, 2006.
- [9] T. Schuster. A novel mollifier inversion scheme for the Laplace transform. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, 1(1), 2002.

1.5 Preprints

- [1] A. Belenkin, M.Hartz and T. Schuster. A note on Γ -convergence of Tikhonov functionals for nonlinear inverse problems. arXiv:2208.05780, 2022.
- [2] M. Burger, T. Schuster and A. Wald. Ill-posedness of time-dependent inverse problems in Lebesgue-Bochner spaces. Work in progress, 2022.
- [3] C. Bender, T. Hohage, and T. Schuster. Nonlinear Landweber iteration with noisy forward operators for parameter identification in SDE's. Work in progress, 2022.