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List of Publications

233 publications in total, including

6 books: [15], [31], [65], [78], [141] [148]

5 chapters in books: [73], [89], [102], [178] [216]

20 edited books or special issues: [59] [61], [87], [98], [96], [103], [112], [114], [119], [129], [128],[133],[143], [156], [180], [186], [189], [191], [192], [225]

90 papers in refereed journals: [2], [6, 7], [10, 11], [12, 13], [16, 17], [25], [28], [32], [34], [41, 42, 40], [43, 44, 46], [51, 52], [54, 55], [57], [60], [62], [63], [66, 70, 72], [80, 81, 84, 85, 86], [92, 94], [99, 100, 101], [106, 113, 110], [115, 116], [122, 123], [134, 137] [140, 138, 142], [149, 150, 151, 154, 152, 157, 159], [163, 166, 168, 164, 165], [172, 173, 174], [179], [188, 190, 194, 195, 201], [203, 202, 204, 207, 209], [210, 211, 212, 213], [214, 218], [223], [228, 229, 230, 231, 233]

81 papers in refereed conference proceedings: [3], [8, 9], [18], [21], [29, 30], [35], [37], [45], [48, 49, 50], [53], [56, 58], [64], [67, 68, 69, 71], [74, 75, 76], [77, 79, 82], [88, 90], [95, 97], [104, 105, 107, 108, 109, 111], [118, 117], [120], [121, 124], [125, 126, 127], [130, 131, 132, 135, 136], [139], [145, 146, 147], [153, 155, 160], [161, 169, 170], [176, 177, 181, 175], [183, 185], [187, 193, 196, 197, 198, 200], [208, 205, 206], [215, 219, 220, 221, 222], [232]

28 non-refereed publications: [4], [14], [19], [20, 22, 23], [26, 27], [33], [36, 38], [39], [47], [83], [91], [93], [144], [158], [167, 171, 162], [182, 184], [199], [217], [224], [226, 227]

3 theses: [1], [5], [24].

References

- [1] U. Langer. Untersuchungen zur numerischen Behandlung des Eigenwertproblems für polynomiale Operatorbüschel. Diplomarbeit, Technische Hochschule Karl–Marx–Stadt, Sektion Mathematik, Karl–Marx–Stadt, 1975. (in German).
- [2] U. Langer. Untersuchungen zum Kummerschen Verfahren zur numerischen Behandlung nichtlinearer Eigenwertaufgaben. *Beiträge zur Numerischen Mathematik*, 6:97 – 110, 1977. (in German).
- [3] U. Langer. Ein effektives Iterationsverfahren zur Lösung von FEM–Systemen. In *VIII. IKM Berichte*, volume 2, pages 311–318, Weimar, 1978.
- [4] U. Langer. On the relaxation parameters in a relaxation method on a sequence of grids. Technical Report Nr. 2636–79, Dep. im VINITI, 18 July 1979 1979. (in Russian).

- [5] U. Langer. *Some FEM–Schemes and their Iterative Solution*. Dissertation kand. fiz.–mat. nauk, University of Leningrad, Leningrad, 1980. (in Russian).
- [6] V.G. Korneev and U. Langer. Iterative solution of FEM–schemes with incomplete elements on regular grids. *Metody Vyčislenij*, 12:116–133, 1981. (in Russian).
- [7] U. Langer. Iterative Lösung von FEM–Schemata für elliptische Randwertprobleme vierter Ordnung. *Wissenschaftliche Zeitschrift der TH Karl–Marx–Stadt*, 23(4):435–440, 1981. (in German).
- [8] U. Langer. Zur effektiven Lösung von FEM–Schemata für elliptische Differentialgleichungen vierter Ordnung. In *IX. IKM Berichte*, volume 2, pages 32–34, 1981.
- [9] U. Langer. Ein direktes Verfahren zur Lösung einer speziellen Klasse von Differentialgleichungen. In *INFO 81, ZfR–Informationen*, volume Sektion V, pages 43–50, 1981.
- [10] U. Langer. On the choice of the iteration parameters in relaxation methods on sequences of grids. *Z. Vyč. Mat. i Mat. Fiz.*, 22(5):1110–1132, 1982. (in Russian).
- [11] U. Langer. Schnelle Verfahren zur Auflösung von FEM–Schemata für lineare und nichtlineare Aufgaben der Kontinuumsmechanik. *Wissenschaftliche Beiträge der IHS Wismar*, 7(1):20 – 23, 1982. (in German).
- [12] U. Langer. On the iterative solution of some FEM–schemes for elliptic equations of the order $2n$, $n > 1$. *Z. Vyč. Mat. i Mat. Fiz.*, 23(4):881–891, 1983. (in Russian).
- [13] M. Jung and U. Langer. Zur numerischen Bestimmung der Konstanten in den Ungleichungen von Friedrichs und Poincare. *Wissenschaftliche Zeitschrift TH Karl–Marx–Stadt*, 25(3):368–375, 1983. (in German).
- [14] U. Langer. Über einige Ergebnisse der numerischen Untersuchung von Aufgaben der elastisch–plastischen Fliesstheorie. In *Seminarberichte “Plastizitätstheorie II”*, volume 4/83, pages 20–33. TU Dresden, 1983. (in German).
- [15] V. G. Korneev and U. Langer. *Approximate solution of plastic flow theory problems*, volume 69 of *Teubner–Texte zur Mathematik*. Teubner–Verlag, Leipzig, 1984.
- [16] V.G. Korneev and U. Langer. On the regularity of the solution of plastic flow theory problems. *Diff. Uravnenija*, 20(4):667–678, 1984.
- [17] U. Langer and W. Queck. Druckiterationsverfahren zur effektiven Lösung inkompressibler elastischer Probleme. *Technische Mechanik*, 5(4):46–52, 1984. (in German).

- [18] U. Langer. Effektive Lösungsverfahren für elliptische Randwertaufgaben in speziellen und beliebigen Gebieten. In *8. Tagung der Mathematischen Physik, Karl-Marx-Stadt 1983*, volume 63 of *Teubner-Texte zur Mathematik*, pages 147–155, Leipzig, 1984. Teubner-Verlag.
- [19] F. Kuhnert, U. Langer, and W. Weinelt. über Ergebnisse der numerischen Forschung zu Problemen der Mechanik. *ZAMM*, 63(10):M468–M469, 1984.
- [20] U. Langer. Vorkonditionierte Iterationsverfahren vom Uzawa-Typ zur Lösung eines gemischten FEM-Schemas für das erste biharmonische Randwertproblem. Technical Report 67 a/b, Wissenschaftliche Information, Technische Universität Karl-Marx-Stadt, Karl-Marx-Stadt, 1985. (in German).
- [21] U. Langer. Iterationsverfahren vom Uzawa-Typ zur Lösung gemischter FEM-Schemata. In *V. Kolloquium "Anwendung mathematischer Methoden in Technik, Technologie und Ökonomie", Tagungsberichte, Sektion 1*, pages 54–56, Wismar, 1985. (in German).
- [22] U. Langer. Moderne numerische Verfahren in der Kontinuumsmechanik. In *AdW-Seminar "Festkörpermechanik und Bruchmechanik"*, number 31 in FMC-Series, pages 51–73. Karl-Marx-Stadt, 1985. (in German).
- [23] M. Jung and U. Langer. FEM-Multigrid-Strategien zur Lösung von Problemen der Festkörpermechanik: Theorie-Anwendung-Software. In *Seminarberichte "FEM IV"*, volume 1/85, pages 8–19. TU Dresden, 1985. (in German).
- [24] U. Langer. *Effektive numerische Verfahren zur Lösung gewisser Klassen partieller Differentialgleichungen*. Habilitation, Technische Hochschule Karl-Marx-Stadt, Karl-Marx-Stadt, 1986. (in German).
- [25] U. Langer and W. Queck. On the convergence factor of Uzawa's algorithm. *Journal of Computational and Applied Mathematics*, 15(1):191–202, 1986.
- [26] M. Jung and U. Langer. Projection type multigrid methods for solving second-order elliptic boundary value problems in plane domains with curved boundaries. In G. Telschow, editor, *Second Multigrid Seminar, Garzau 1985*, number Report R-MATH-08/86, pages 63–87, Berlin, 1986. Karl-Weierstrass-Institut.
- [27] U. Langer. Schnelle Verfahren zur Lösung des ersten biharmonischen Randwertproblems. Teil 1–3. Technical Report Preprint 7–9, Technische Universität Karl-Marx-Stadt, Karl-Marx-Stadt, 1986.
- [28] U. Langer. Zur numerischen Lösung des ersten biharmonischen Randwertproblems. *Numerische Mathematik*, 50:291–310, 1987. (in German).
- [29] U. Langer. Multigrid-methods for some problems in solid mechanics. In *Algoritmy '87, 9. Sympozia o Algoritmoch, Zbornik Prednasok*, pages 149–154, 1987.

- [30] U. Langer. Multigrid-Verfahren zur Lösung von Aufgaben der elastisch-plastischen Fliesstheorie. In *XI. IKM, Berichte*, volume 4, pages 33–36, Weimar, 1987.
- [31] U. Langer and W. Queck. *Preconditioned Uzawa-type iterative methods for solving mixed finite element equations*, volume 3 of *Wissenschaftliche Schriftenreihe*. Technische Universität Karl-Marx-Stadt, Karl-Marx-Stadt, 1987.
- [32] U. Langer. Fast iterative methods for the solution of the first boundary value problem for the biharmonic differential equation. *Z. Vyč. Mat. i Mat. Fiz.*, 28(2):209–223, 1988. (in Russian).
- [33] M. Jung, U. Langer, A. Meyer, W. Queck, and M. Schneider. Multigrid preconditioners and their applications. In G. Telschow, editor, *Third Multigrid Seminar, Biesenthal 1988*, number Report R-MATH-03/89, pages 11–52, Berlin, 1989. Karl-Weierstrass-Institut.
- [34] M. Jung, U. Langer, and U. Semmler. Two-level hierarchically preconditioned conjugate gradient methods for solving linear elasticity finite element equations. *BIT*, 29:748–768, 1989.
- [35] U. Langer. Applications of multigrid preconditioners to mixed and nonlinear variational problems. In *9. TMP, Karl-Marx-Stadt 1988*, volume 111 of *Teubner-Texte zur Mathematik*, pages 148–158, Leipzig, 1989. Teubner-Verlag.
- [36] G. Globisch and U. Langer. On the use of multigrid preconditioners in a multigrid software package. In G. Telschow, editor, *Fourth Multigrid Seminar, Berlin 1988*, number Report R-MATH-03/90, pages 105–134, Berlin, 1990. Karl-Weierstrass-Institut.
- [37] G. Haase and U. Langer. On the use of multigrid preconditioners in the domain decomposition method. In W. Hackbusch, editor, *Parallel Algorithms for PDEs*, pages 101–110, Braunschweig/ Wiesbaden, 1990. Vieweg. Proc. of the 6th GAMM-Seminar, Kiel, 1990.
- [38] A. Meyer G. Haase, U. Langer. A new approach to the Dirichlet domain decomposition method. In G. Telschow, editor, *Fifth Multigrid Seminar, Eberswalde 1990*, number Report R-MATH-09/90, pages 1–59, Berlin, 1990. Karl-Weierstrass-Institut.
- [39] M. Jung, U. Langer, and W. Queck. Zum Einsatz des Programmpaketes FEMGP auf einem Transputer und auf Personalcomputern verschiedener Leistungsfähigkeit. Preprint 190, Technische Universität Chemnitz, Sektion Mathematik,, Chemnitz, 1991. (in German).
- [40] M. Jung and U. Langer. Application of multilevel methods to practical problems. *Surveys on Mathematics for Industry*, 1:217–257, 1991.

- [41] G. Haase, U. Langer, and A. Meyer. The approximate Dirichlet decomposition method. part I : An algebraic approach. *Computing*, 47:137–151, 1991.
- [42] G. Haase, U. Langer, and A. Meyer. The approximate Dirichlet domain decomposition method. II. Applications to 2nd-order elliptic BVPs. *Computing*, 47(2):153–167, 1991.
- [43] D. Bahlmann and U. Langer. A fast solver for the first biharmonic boundary value problem. *Numerische Mathematik*, 63:297–313, 1992.
- [44] G. Haase and U. Langer. The non-overlapping domain decomposition multiplicative schwarz method. *International Journal of Computer Mathematics*, 44:223–242, 1992.
- [45] G. Haase, U. Langer, and A. Meyer. The Dirichlet domain decomposition method using inner multigrid solvers. In R. Beauwens and P. de Groen, editors, *Iterative Methods in Linear Algebra*, page 91. Elsevier Science Publisher B. V., 1992. Proceedings of the IMACS–Conference, Brussels 1991.
- [46] G. Haase, U. Langer, and A. Meyer. Domain decomposition preconditioners with inexact subdomain solvers. *Journal of Numerical Linear Algebra with Applications*, 1(1):27–41, 1992.
- [47] U. Langer. Substrukturtechnik und Schwarzsche Methoden. *GAMM–Mitteilungen*, 15(2):86–103, 1992.
- [48] G. Haase and U. Langer. Domain decomposition vs. adaptivity. In M. Krizek, P. Neittaanmaki, and R. Stenberg, editors, *The Finite Element Method: Fifty Years of the Courant Element*, pages 243–257, Jyväskylä, 1993. Marcel Dekker Publ. Inc.
- [49] G. Haase and U. Langer. Iterative solution techniques in the fem on massively parallel computers. In W. Rönsch and J. Schüle, editors, *Parallelisierung im Wissenschaftlichen Rechnen*, Informatik Berichte 1993-04, pages 49 – 61, Braunschweig, 1993. TU Braunschweig. Proceedings of a workshop held in Braunschweig, June 2 - 4, 1993.
- [50] G. Haase, U. Langer, and A. Meyer. Parallelisierung und vorkonditionierung des cg-verfahrens durch gebietszerlegung. In *Numerische Algorithmen auf Transputer-Systemen*, pages 80–116, Stuttgart, 1993. Teubner-Verlag.
- [51] G. Haase, U. Langer, A. Meyer, and S.V. Nepomnyaschikh. Hierarchical extension operators and local multigrid methods in domain decomposition preconditioners. *East-West J. Num. Math.*, 2:173–193, 1994.
- [52] U. Langer. Parallele Algorithmen zur Lösung von Randelementgleichungen. *ZAMM*, 75(6):516 – 518, 1994. (in German).

- [53] U. Langer. Parallel iterative solution of symmetric coupled FE/BE-equation via domain decomposition. In A. Quarteroni, J. Periaux, Y.A. Kuznetsov, and O.B. Widlund, editors, *Sixth International Conference on Domain Decomposition Methods in Science and Engineering, Como, June 15-19, 1992*, volume 157 of *Contemporary Mathematics*, pages 335–344, Providence, Rhode Island, 1994. AMS.
- [54] G. Haase and U. Langer. The efficient parallel solution of pdes. *Computers Meth. Applic.*, 31(4/5):151–159, 1996.
- [55] M.Kuhn and U. Langer. Parallel algorithms for symmetric boundary element equations. *ZAMM*, 76:269–272, 1996.
- [56] G. Haase, B. Heise, M. Kuhn, and U. Langer. Adaptive domain decomposition methods for finite and boundary element equations. In W.L. Wendland, editor, *Boundary Element Topics*, pages 121 –147. Springer, Berlin, Heidelberg, New York, 1997.
- [57] F. Kickingger and U. Langer. A note on the global extraction element-by-element method. *ZAMM*, 78:S965–S966, 1997.
- [58] M. Kuhn and U. Langer. Adaptive domain decomposition methods in fem and bem. In J.R. Whiteman, editor, *Proceedings of the MAFELAP 1996*, pages 103 –122. John Wileys & Sons, 1997. Proceedings of the MAFELAP 1996 held at the Brunel University of West London, June 25 - 28, 1996.
- [59] U. Langer. Editorial to this special issue on plasticity. *Numerical Linear Algebra with Applications*, 4(3):131, 1997.
- [60] C. Carstensen, M. Kuhn, and U. Langer. Fast parallel solvers for symmetric boundary element domain decomposition equations. *Numerische Mathematik*, 79:321–347, 1998.
- [61] M. Günther, U. Langer, and U. van Rienen. Résumé of the collection of articles on scientific computing in electrical engineering. *Surveys on Mathematics for Industry*, 9(2):151–155, 1999.
- [62] B. Heise, M. Kuhn, and U. Langer. A mixed variational formulation for 3d magnetostatics in the space $H_0(\text{rot}) \cap H(\text{div})$. *Hungarian Electronic Journal (HEJ), Section "Applied and Numerical Mathematics"*, (ANM-981030-A):20 pp., 1999. <http://heja.math.szif.hu/ANM/>.
- [63] M. Schinnerl, J. Schöberl, M. Kaltenbacher, U. Langer, and R. Lerch. Multigrid methods for the fast numerical simulation of coupled magnetomechanical systems. *ZAMM*, 80(Suppl. 1):117–120, 2000.
- [64] M. Kuhn, U. Langer, and J. Schöberl. Scientific computing tool for 3d magnetic field problems. In J.R. Whiteman, editor, *Proceedings of the MAFELAP 1999*, pages 239 – 258, Amsterdam, 2000. Elsevier. Proceedings of the MAFELAP 1999 held at the Brunel University of West London, June 22 - 25, 1999.

- [65] M. Jung and U. Langer. *Methode der finiten Elemente für Ingenieure: Eine Einführung in die numerischen Grundlagen und Computersimulation*. Teubner-Verlag, Stuttgart, 2001.
- [66] G. Haase, M. Kuhn, and U. Langer. Parallel multigrid 3d Maxwell solvers. *Parallel Computing*, 27(6):761–775, 2001.
- [67] G. Haase, M. Kuhn, and U. Langer. Parallel 3d Maxwell solvers based on domain decomposition data distribution. In T. Chan, T. Kako, H. Kawarada, and O. Pironneau, editors, *Domain Decomposition Methods*, pages 353 – 364. Published by DDM.org, 2001. Proceedings of the 12th International Conference on *Domain Decomposition Methods* held at Chiba University, Japan, October 25 - 29, 1999.
- [68] G. Haase, U. Langer, E.H. Lindner, and W. Mühlhuber. Optimal sizing using automatic differentiation. In K.-H. Hoffmann, K.H.W. Hoppe, and V. Schulz, editors, *Fast Solution of Discretized Optimization Problems*, International Series on Numerical Mathematics, pages 120 –138. Birkhäuser, 2001. Proceedings of Conference on *Fast Solution of Discretized Optimization Problems*, held at WIAS, Berlin, May 8 - 12, 2000.
- [69] G. Haase, U. Langer, E.H. Lindner, and W. Mühlhuber. Various methods for structural optimization problems with industrial applications. In W.A. Wall, K.-U. Bletzinger, and K. Schweizerhof, editors, *Trends in Computational Structural Mechanics*, pages 623 – 636, Barcelona, Spain, 2001. CIMNE.
- [70] G. Haase, U. Langer, S. Reitzinger, and J. Schöberl. Algebraic multigrid methods based on element preconditioning. *International Journal of Computer Mathematics*, 78(4):575–588, 2001.
- [71] U. Langer St. Reitzinger J. Schöberl G. Haase, M. Kuhn. Parallel maxwell solvers. In U. van Rienen, M. Günther, and D. Hecht, editors, *Scientific Computing in Electrical Engineering*, pages 71 – 78. Springer-Verlag, Heidelberg 2001. Proceedings of the 3rd International Workshop on “*Scientific Computing in Electrical Engineering*” (SCEE’2000) held at Warnemünde, Germany, August 20 - 22, 2000.
- [72] M. Schinnerl, U. Langer, and R. Lerch. Multigrid simulation of electromagnetic actuators. *ZAMM*, 81(Suppl. 3):729–730, S729 - S730 2001.
- [73] G. Haase and U. Langer. *Modern Methods in Scientific Computing and Applications*, volume 75 of *NATO Science Series II. Mathematics, Physics and Chemistry*, chapter Multigrid Methods: From Geometrical to Algebraic Versions, pages 103–154. Kluwer Academic Press, Dordrecht, 2002.
- [74] G. Haase, U. Langer, E.H. Lindner, and W. Mühlhuber. Optimal sizing of industrial structural mechanics problems using automatic differentiation. In G. Corliss, C. Faure, A. Griewank, L. Hascoet, and U. Naumann, editors, *Proceedings of*

- “*Automatic Differentiation 2000: From Simulation to Optimization*, pages 181–188. Springer, 2002.
- [75] M. Hofer, N. Finger, S. Zaglmayr, J. Schöberl, G. Kovacs, U. Langer, and R. Lerch. Finite element calculation of the dispersion relations of infinitely extended saw structures including bulk wave radiation. In Vittal S. Rao, editor, *Smart Structures and Materials 2002: Modeling, Signal Processing and Control*, SPIE, pages 472–483, 2002.
- [76] M. Hofer, N. Finger, G. Kovacs, J. Schöberl, U. Langer, and R. Lerch. Finite element simulation of bulk- and surface acoustic wave (saw) interaction in saw devices. In *Proceedings of the IEEE Ultrasonics Symposium*, pages 51–54. IEEE, 2002.
- [77] N. Finger, G. Kovacs, J. Schöberl, and U. Langer. Accurate fem/bem-simulation of surface acoustic wave filters. In *Proceedings of the International Frequency Control Symposium 2003 (accepted)*, 2003.
- [78] C.C. Douglas, G. Haase, and U. Langer. *A Tutorial on Elliptic PDE Solvers and Their Parallelization*. Software, Environments, and Tools,. SIAM, Philadelphia, 2003.
- [79] G. Haase, U. Langer, W. Mühlhuber, and C. Rathberger. Optimal sizing of industrial structural mechanics problems using automatic differentiation. In K. Gürlebeck, L. Hempel, , and C. Könke, editors, *Digital Proceedings of the 16th International Conference on the Application of Computer Sciences and Mathematics in Architecture and Civil Engineering, Weimar, June 10-12, 2003*, pages 18 pages, (ISSN 1611–4086), Weimar, 2003. IKM.
- [80] V.G. Korneev, U. Langer, and L. Xanthis. On fast domain decomposition solving procedures for *hp*-discretizations of 3d elliptic problems. *Computational Methods in Applied Mathematics*, 3(4):536–559, 2003.
- [81] V. G. Korneev, U. Langer, and L. Xanthis. Fast adaptive domain decomposition algorithms for *hp*-discretizations of 2-d and 3-d elliptic equations: Recent advances. *Hermis- μ : An International Journal of Computer Mathematics and its Applications*, 4(4):27–44, 2003.
- [82] U. Langer, S. Reitzinger, and J. Schicho. Symbolic methods for the element preconditioning technique. In F. Winkler and U. Langer, editors, *Symbolic and Numerical Scientific Computation*, volume 2630 of *Lecture Notes in Computer Sciences*, pages 293–308, Heidelberg, 2003. Springer-Verlag.
- [83] U. Langer and D. Pusch. Algebraic multigrid preconditioners for adaptive-cross-approximated boundary element matrices. In *Industrial Mathematics and Mathematical Modelling*, pages 77–85, 2003. Proceedings of the IMAMM’2003 held at Roznov pod Radhostem, Czech Republic, June 30 - July 4, 2003.

- [84] U. Langer, D. Pusch, and S. Reitzinger. Algebraic multigrid preconditioners for sparse approximations of boundary element matrices. *PAMM*, 3(1):579–580, 2003.
- [85] U. Langer, D. Pusch, and S. Reitzinger. Efficient Preconditioners for Boundary Element Matrices Based on Grey-Box Algebraic Multigrid Methods. *International Journal for Numerical Methods in Engineering*, 58(13):1937–1953, 2003.
- [86] U. Langer and O. Steinbach. Boundary element tearing and interconnecting methods. *Computing*, 71(3):205–228, 2003.
- [87] F. Winkler and U. Langer, editors. *Symbolic and Numeric Scientific Computation. Second International Conference, SNSC 2001, Hagenberg, Austria, September 2001*, LNCS 2630. Springer-Verlag, Heidelberg, 2003.
- [88] J. Kienesberger, U. Langer, and J. Valdman. On a robust multigrid-preconditioned solver for incremental plasticity problems. In *Proceedings of IMET 2004 - Iterative Methods, Preconditioning & Numerical PDEs*, pages 84–87, 2004.
- [89] V. G. Korneev and U. Langer. Domain decomposition and preconditioning. In E. Stein, R. de Borst, and Th.J.R. Hughes, editors, *Encyclopedia of Computational Mechanics*, volume 1, pages 617–647. John Wiley & Sons, 2004.
- [90] U. Langer and O. Steinbach. Coupled boundary and finite element tearing and interconnecting methods. In R. Kornhuber, R. Hoppe, J. Periaux, O. Pironneau, O. Widlund, and J. Xu, editors, *Domain Decomposition Methods in Sciences and Engineering*, volume 40 of *Lecture Notes in Computational Sciences and Engineering*, pages 83–97, Heidelberg, 2004. Springer.
- [91] D. Lukáš, U. Langer, E. Lindner, R. Stainko, and J. Pištora. Computational shape and topology optimization with applications to 3-dimensional magneto-statics. In U. Langer, R. W. Hoppe, and R. Hiptmair, editors, *Proceedings of the Oberwolfach Workshop on Computational Electromagnetism 2004*, volume 1 of *Oberwolfach Reports*, pages 601–603, 2004.
- [92] F. Bachinger, U. Langer, and J. Schöberl. Numerical analysis of nonlinear multiharmonic eddy current problems. *Numerische Mathematik*, 100:593–616, 2005.
- [93] U. Langer, A. Pohoata, and O. Steinbach. Dual-primal boundary element tearing and interconnecting methods. Technical Report Bericht 2005/6, Technische Universität Graz, Institut für Mathematik D, 2005.
- [94] U. Langer and D. Pusch. Data-Sparse Algebraic Multigrid Methods for Large Scale Boundary Element Equations. *Applied Numerical Mathematics*, 54:406–424, 2005.
- [95] U. Langer and D. Pusch. Comparison of geometrical and algebraic multigrid preconditioners for data-sparse boundary element matrices. In I. Lirkov,

- S. Margenov, and J. WaśniewskiS, editors, *Proceedings of the Fifth International Conference on Large Scale Scientific Computations (LSSC'2005), July 6-10, 2005, Sozopol, Bulgaria*, Lecture Notes in Computer Science, pages 130–137, Heidelberg, Berlin, 2006. Springer.
- [96] U.Langer, O. Steinbach, and W. Wendland, editors. *Fast Boundary Element Methods in Industrial Applications*, volume 8 of *Special Issue of the journal "Computing and Visualization in Science"*, Heidelberg, December 2005. Springer Verlag.
- [97] S. Zaglmayr, J. Schöberl, and U. Langer. Eigenvalue problems in surface acoustic wave filter simulations. In , editor, *Progress in Industrial Mathematics at ECMI 2004*, pages 74–98, Heidelberg, Berlin, New York, 2005. Springer.
- [98] G. Larcher J. Maaß, U. Langer, editor. *Philosophie und Geschichte der Mathematik: Vorträge aus dem Johannes Kepler Symposium 1995 - 2005*, volume 5 of *Geschichte der Naturwissenschaften und der Technik*, Linz, 2005. Johannes Kepler Universität Linz, Universitätsverlags Rudolf Trauner.
- [99] F. Bachinger, U. Langer, and J. Schöberl. Efficient solvers for nonlinear time-periodic eddy current problems. *Computing and Visualization in Science*, 9(4):197–207, 2006.
- [100] M. Hofer, N. Finger, G. Kovacs, J. Schöberl, S. Zaglmayr, U. Langer, and R. Lerch. Finite Element Simulation of Wave Propagation in Periodic Piezoelectric SAW Structures. *IEEE Transactions on UFFC*, 53(6):1192–1201, 2006.
- [101] U. Langer and C. Pechstein. Coupled finite and boundary element tearing and interconnecting methods applied to nonlinear potential problems. *Z. Angew. Math. Mech. (ZAMM)*, 86(12):915–931, 2006.
- [102] U. Langer and O. Steinbach. Coupled finite and boundary element domain decomposition methods. In M. Schanz and O. Steinbach, editors, *Boundary Element Analysis: Mathematical Aspects and Applications*, volume 29 of *Lecture Notes in Applied and Computational Mechanics*, pages 29–59, Berlin, 2007. Springer.
- [103] J. Kraus and U. Langer, editors. *Lectures on Advanced Computational Methods in Mechanics*, volume 1 of *Radon Series on Computational and Applied Mathematics*, Berlin, 2007. Walter de Gruyter GmbH & Co.
- [104] W. Elleithy and U. Langer. Automatic generation of coupled finite element-boundary element discretization. In *Proceedings of the Sixth Alexandria International Conference on Structural and Geotechnical Engineering (AICSGE6)*, pages ST17–ST28, Alexandria, Egypt, April 2007.
- [105] W. Elleithy and U. Langer. Adaptive fem–bem coupling method for elasto-plastic analysis. In *Advances in Boundary Element Techniques VIII*, pages 269–274, Eastleigh, April 2007. EC Ltd. UK. Proceedings of the International Conference on Boundary Element Techniques VIII held at Naples, Italy, 24-26 July, 2007.

- [106] U. Langer, G. Of, O. Steinbach, and W. Zulehner. Inexact data-sparse boundary element tearing and interconnecting methods. *SIAM Journal on Scientific Computing*, 29(1):290–314, 2007.
- [107] U. Langer, G. Of, O. Steinbach, and W. Zulehner. Inexact fast multipole BETI methods. In D. Keys and O. Widlund, editors, *Domain Decomposition Methods in Sciences and Engineering XVI*, volume 55 of *Lecture Notes in Computational Sciences and Engineering*, pages 407–414. Springer, 2007.
- [108] U. Langer and C. Pechstein. Coupled feti/beti solvers for nonlinear potential problems in (un)bounded domains. In G. Ciuprina and D. Ioan, editors, *Proceedings of the SCEE 2006*, volume 11 of *Mathematics in Industry*, pages 371–377, Heidelberg, 2007. Springer.
- [109] U. Langer, W. Zulehner, H. Yang, and M. Baumgartner. Gstokes: A grid-enabled solver for the 3d stokes/navier-stokes system on hybrid meshes. In D. Kranzlmüller, W. Schreiner, and J. Volkert, editors, *Proceedings of the 6th International Symposium on Parallel and Distributed Computing (ISPDE 2007) held at Hagenberg, Austria, July 5–8, 2007*, pages 377–382. CPS, 2007.
- [110] M. Schinnerl, M. Kaltenbacher, U. Langer, R. Lerch, and J. Schöberl. An efficient method for the numerical simulation of magneto-mechanical sensors and actuators. *European Journal of Applied Mathematics*, 18:233–271, 2007.
- [111] H. Yang, W. Zulehner, U. Langer, and M. Baumgartner. A robust PDE solver for the 3D Stokes/Navier-Stokes systems on the grid environment. In *GRID*, pages 145–152. IEEE, 2007.
- [112] U. Langer, M. Discacciati, D.E. Keyes, O.B. Widlund, and W. Zulehner, editors. *Domain Decomposition Methods in Science and Engineering XVII*, volume 60 of *Lecture Notes in Computational Science and Engineering*, Heidelberg, 2008. Springer.
- [113] U. Langer and D. Pusch. Convergence analysis of geometrical multigrid methods for solving data-sparse boundary element equations. *Computing and Visualization in Science*, 11(3):181–189, 2008.
- [114] U. Langer and O. Steinbach. Editorial to this special issue dedicated to Wolfgang L. Wendland on the occasion of his 70th birthday. *Math. Methods Appl. Sci.*, 31(17):2013–2014, 2008.
- [115] U. Langer and C. Pechstein. All-floating coupled data-sparse boundary and interface-concentrated finite element tearing and interconnecting methods. *Computing and Visualization in Science*, 11:307–317, 2008.
- [116] S. Beuchler, T. Eibner, and U. Langer. Primal and dual interface concentrated iterative substructuring methods. *SIAM Journal on Numerical Analysis*, 46(6):2818–2842, 2008.

- [117] W. Elleithy and U. Langer. Efficient elasto-plastic analysis via an adaptive finite element–boundary element coupling method. In *Boundary elements and other mesh reduction methods XXX*, volume 47 of *WIT Trans. Model. Simul.*, pages 229–238. WIT Press, Southampton, 2008.
- [118] U. Langer. Boundary and finite element domain decomposition methods. In K. Kunisch, G. Of, and O. Steinbach, editors, *Proceedings of ENUMATH 2007, the 7th European Conference on Numerical Mathematics and Advanced Applications, Graz, Austria, September 2007*, pages 15–26, Heidelberg, 2008. Springer.
- [119] T. Apel, A. Böttcher, G. Haase, B. Heinrich, M. Jung, U. Langer, A. Meyer, A. Rösch, and O. Steinbach. Special volume with selected papers from the 20th Chemnitz Finite Element Symposium. *Electron. Trans. Numer. Anal.*, 32:vii, 2008. Held in Chemnitz, September 24–26, 2007.
- [120] D. Copeland, U. Langer, and D. Pusch. From the boundary element ddm to local trefftz finite element methods on polyhedral meshes. In M. Bercovier, M. Gander, R. Kornhuber, and O. Widlund, editors, *Domain Decomposition Methods in Science and Engineering XVIII*, Lecture Notes in Computational Science and Engineering (LNCSE), pages 315–322, Heidelberg, 2009. Springer.
- [121] C. Hofreither, U. Langer, and S. Tomar. Boundary element simulation of linear water waves in a model basin. In I. Lirkov, S. Margenov, and J. Wasniewski, editors, *Proceedings of 7th International Conference on Large Scale Scientific Computations (LSSC09)*, volume 5910 of *Lecture Notes in Computer Science (LNCS)*, pages 132–139, Berlin, Heidelberg, New York, 2010. Springer-Verlag.
- [122] D.M. Copeland and U. Langer. Domain decomposition solvers for nonlinear multiharmonic finite element equations. *Journal of Numerical Mathematics*, 3:157–176, 2010.
- [123] C. Hofreither, U. Langer, and C. Pechstein. Analysis of a non-standard finite element method based on boundary integral operators. *Electronic Transactions on Numerical Analysis (ETNA)*, 37:413–436, 2010.
- [124] U. Langer, H. Yang, and W. Zulehner. Numerical simulation of fluid-structure interaction problems on the grid environment. In J. Volkert, T. Fahringer, D. Kranzlmüller, R. Kobler, and W. Schreiner, editors, *Proceedings of 3rd Austrian Grid Symposium*, pages 13–27, Vienna, 2010. OCG publisher.
- [125] D. Copeland, M. Kolmbauer, and U. Langer. Domain decomposition solvers for frequency-domain finite element equation. In Y. Huang, R. Kornhuber, O. Widlund, and J. Xu, editors, *Domain Decomposition Methods in Science and Engineering XIX*, volume 78 of *Lecture Notes in Computational Science and Engineering (LNCSE)*, pages 301–308, Heidelberg, 2011. Springer.
- [126] C. Hofreither, U. Langer, and C. Pechstein. A non-standard finite element method for convection-diffusion-reaction problems on polyhedral meshes. In

- Michail D. Todorov and Christo I. Christov, editors, *Application of Mathematics in Technical and Natural Sciences: 3rd International Conference - AMiTaNS'11*, volume 1404 of *AIP Conference Proceedings*, pages 397–404. AIP, 2011.
- [127] M. Kolmbauer and U. Langer. A robust preconditioned minres solver for distributed time-periodic eddy current optimal control problems. In R.E. Bank, W. Hackbusch, and G. Wittum, editors, *Fast Solvers for Partial Differential Equations*, volume 8 of *Oberwolfach Reports*, pages 1561–1563. EMS Publishing House, 2011.
- [128] U. Langer, M. Schanz, O. Steinbach, and W. L. Wendland, editors. *Fast Boundary Element Methods in Engineering and Industrial Applications*, volume 63 of *Lecture Notes in Applied and Computational Mechanics*, Berlin, Heidelberg, 2012. Springer-Verlag.
- [129] U. Langer and P. Paule, editors. *Numerical and Symbolic Scientific Computation: Progress and Prospects*, Texts and Monographs in Symbolic Computation. Springer-Verlag, Wien, 2012.
- [130] P. G. Gruber, J. Kienesberger, U. Langer, J. Schöberl, and J. Valdman. Fast solvers and a posteriori error estimates in elastoplasticity. In U. Langer and P. Paule, editors, *Numerical and Symbolic Scientific Computation: Progress and Prospects*, Texts and Monographs in Symbolic Computation, pages 45–63. Springer-Verlag, Wien, 2012.
- [131] M. Kolmbauer and U. Langer. A frequency-robust solver for the time-harmonic eddy current problem. In B. Michielsen and J.-R. Poirier, editors, *Scientific Computing in Electrical Engineering SCEE 2010*, volume 16 of *Mathematics in Industry*, pages 97–105. Springer Berlin Heidelberg, 2012.
- [132] C. Hofreither, U. Langer, and C. Pechstein. A non-standard finite element method based on boundary integral operators. In I. Lirkov, S. Margenov, and J. Wasniewski, editors, *Proceedings of 8th International Conference on Large Scale Scientific Computations (LSSC11)*, volume 7116 of *Lecture Notes in Computer Science (LNCS)*, pages 27–39, Berlin, Heidelberg, New York, 2012. Springer-Verlag.
- [133] V. Korneev, Y. Kuznetsov, U. Langer, and A. Matsokin. Editorial. *Computational Methods in Applied Mathematics*, 12(4):367–368, 2012. Special Issue dedicated to the blessed memory of Sergei Nepomnyaschikh - a pioneer in domain decomposition methods.
- [134] M. Kolmbauer and U. Langer. A robust preconditioned-minres-solver for distributed time-periodic eddy current optimal control problems. *SIAM Journal on Scientific Computing*, 34(6):B785–B809, 2012.
- [135] U. Langer and H. Yang. Domain decomposition solvers for some fluid-structure interaction problems. *Proc. Appl. Math. Mech. (PAMM)*, 12(1):375–376, 2012.

- [136] U. Langer and M. Wolfmayr. Multiharmonic finite element analysis of a time-periodic parabolic optimal control problem. *Proc. Appl. Math. Mech. (PAMM)*, 12(1):687–688, 2012.
- [137] P. Gangl and U. Langer. Topology optimization of electric machines based on topological sensitivity analysis. *Computat. and Visualiz. in Science*, 15(6):345–354, 2012.
- [138] M. Kolmbauer and U. Langer. A robust preconditioned MinRes solver for time-periodic eddy current problems. *Computational Methods in Applied Mathematics*, 13(1):1–20, 2013.
- [139] M. Kolmbauer and U. Langer. Efficient solvers for some classes of time-periodic eddy current optimal control problems. In Oleg P. Iliev, Svetozar D. Margenov, Peter D. Minev, Panayot S. Vassilevski, and Ludmil T. Zikatanov, editors, *Numerical Solution of Partial Differential Equations: Theory, Algorithms, and Their Applications: In Honor of Professor Raytcho Lazarov's 40 Years of Research in Computational Methods and Applied Mathematics*, volume 45 of *Springer Proceedings in Mathematics & Statistics*, pages 203–216, Heidelberg, 2013. Springer-Verlag.
- [140] M. Kollmann, M. Kolmbauer, U. Langer, M. Wolfmayr, and W. Zulehner. A finite element solver for a multiharmonic parabolic optimal control problem. *Computers and Mathematics with Applications*, 65:469–486, 2013.
- [141] M. Jung and U. Langer. *Methode der finiten Elemente für Ingenieure: Eine Einführung in die numerischen Grundlagen und Computersimulation*. Springer-Vieweg-Verlag, Darmstadt, 2013. 2., überarb. u. erw. Aufl., 639 S.
- [142] U. Langer and M. Wolfmayr. Multiharmonic finite element analysis of a time-periodic parabolic optimal control problem. *Journal of Numerical Mathematics*, 21(4):265–300, 2013.
- [143] I. Graham, U. Langer, M. Melenk, and M. Sini, editors. *Direct and Inverse Problems in Wave Propagation and Applications*, volume 14 of *Radon Series Comp. Appl. Math.* alter de Gruyter, Berlin - New York, 2013.
- [144] U. Langer and H. Yang. Numerical simulation of fluid-structure interaction problems with hyperelastic models: A monolithic approach. RICAM-Report 2014-9, Johann Radon Institute for Computational and Applied Mathematics, Austrian Academy of Sciences, Linz, 2014. accepted for publication in the journal "Mathematics and Computers in Simulation", <http://dx.doi.org/10.1016/j.matcom.2016.07.008>, also available at <http://arxiv.org/abs/1408.3737>.
- [145] C. Hofreither, U. Langer, and C. Pechstein. FETI solvers for non-standard finite element equations based on boundary integral operators. In J. Erhel, M.J. Gander, L. Halpern, G. Pichot, T. Sassi, and O.B. Widlund, editors, *Domain*

- Decomposition Methods in Science and Engineering XXI*, volume 98 of *Lecture Notes in Computational Science and Engineering (LNCSE)*, pages 731–738, Heidelberg, 2014. Springer.
- [146] B. Jüttler, U. Langer, A. Mantzaflaris, S. E. Moore, and W. Zulehner. Geometry + simulation modules: Implementing isogeometric analysis. *PAMM*, 14(1):961–962, 2014.
- [147] G. Bramerdorfer, P. Gangl, A. Fohler, U. Langer, and W. Amrhein. Determination of the cogging torque sensitivity of brushless permanent magnet machines due to changes of the material characteristics of ferromagnetic components. In *PEMD2014, The 7th IET international conference on Power Electronics, Machines and Drives*, page 6 pages, April 2014.
- [148] V.G. Korneev and U. Langer. *Dirichlet-Dirichlet Domain Decomposition Methods for Elliptic Problems: h and hp Finite Element Discretizations*. World Scientific Publishing Company Incorporated, New Jersey - London - Singapore, 2015.
- [149] U. Langer and H. Yang. Numerical simulation of fluid-structure interaction problems with hyperelastic models I: A partitioned approach. *Journal of Computational and Applied Mathematics*, 276:47–61, 2015.
- [150] C. Hofreither, U. Langer, and C. Pechstein. BEM-based Finite Element Tearing and Interconnecting methods. *Electronic Transactions on Numerical Analysis (ETNA)*, 44:230–249, 2015.
- [151] U. Langer, S. Repin, and M. Wolfmayr. Functional a posteriori error estimates for parabolic time-periodic boundary value problem. *Computational Methods in Applied Mathematics*, 15(3):353–372, 2015.
- [152] P. Gangl, U. Langer, A. Laurain, H. Meftahi, and K. Sturm. Shape optimization of an electric motor subject to nonlinear magnetostatics. *SIAM Journal on Scientific Computing*, 37(6):B1002–B1025, 2015.
- [153] U. Langer and H. Yang. Algebraic multigrid based preconditioners for fluid-structure interaction and its related sub-problems. In I. Lirkov, S. Margenov, and J. Wasniewski, editors, *Large-Scale Scientific Computations LSSC 2015*, volume 9374 of *Lecture Notes in Computer Science*, pages 87–95, Heidelberg, 2015. Springer-Verlag.
- [154] U. Langer, A. Mantzaflaris, S. E. Moore, and I. Touloupoulos. Mesh grading in isogeometric analysis. *Computers and Mathematics with Applications*, 70(7):1685–1700, 2015.
- [155] U. Langer, A. Mantzaflaris, S.E. Moore, and I. Touloupoulos. Multipatch discontinuous Galerkin isogeometric analysis. In B. Jüttler and B. Simeon, editors, *Isogeometric Analysis and Applications IGAA 2014*, volume 107 of *Lecture Notes in Computer Science*, pages 1–32, Heidelberg, 2015. Springer.

also available as Technical Report no. 18 at <http://www.gs.jku.at> and at <http://arxiv.org/abs/1411.2478>.

- [156] U. Langer. Editorial. *Computational Methods in Applied Mathematics*, 15(4):415–416, 2015. Special Issue dedicated to 6th International Conference on Computational Methods in Applied Mathematics.
- [157] S. Amstutz, P. Gangl, and U. Langer. Topology optimization of electric motor using topological derivative for nonlinear magnetostatics. *IEEE Transactions on Magnetics*, 52(3):1–4, 2015. available online at: DOI 10.1109/TMAG.2015.2496172.
- [158] U. Langer and H. Yang. Numerical simulation of parabolic moving and growing interface problems using small mesh deformation. RICAM Report 16, Johann Radon Institute for Computational and Applied Mathematics, Austrian Academy of Sciences, Linz, 2015. also available at <http://arxiv.org/abs/1507.08784>.
- [159] U. Langer and I. Touloupoulos. Analysis of multipatch discontinuous Galerkin IgA approximations to elliptic boundary value problems. *Computing and Visualization in Science*, 17(5):217–233, 2015.
- [160] A. Mantzaflaris, B. Jüttler, B. Khoromskij, and U. Langer. Matrix generation in isogeometric analysis by low rank tensor approximation. In J.-D. Boissonat et al., editor, *Curves and Surfaces*, volume 9213 of *Lecture Notes in Computer Science*, pages 321–340. Springer, Berlin, Heidelberg, 2015.
- [161] U. Langer and S.E. Moore. Discontinuous Galerkin isogeometric analysis of elliptic PDEs on surfaces. In Th. Dickopf, M. Gander, L. Halpern, R. Krause, and L.F. Pavarino, editors, *Domain Decomposition Methods in Science and Engineering XXII*, volume 104 of *Lecture Notes in Computational Science and Engineering*, pages 319–326. Springer, 2016.
- [162] C. Hofer, U. Langer, A. Mantzaflaris, S. Moore, M. Neumüller, and I. Touloupoulos. Multipatch discontinuous galerkin space and space-time iga: Error estimates and fast solvers. In A. Kunoth B. Simeon T. Hughes, B. Jüttler, editor, *Report No. 8/2016 on the Oberwolfach Miniworkshop on "Mathematical Foundations of Isogeometric Analysis", 7 – 14 February 2016, Oberwolfach, Germany*, volume 13 of *Oberwolfach Reports*, pages 361–364, 2016.
- [163] U. Langer, S. Moore, and M. Neumüller. Space-time isogeometric analysis of parabolic evolution equations. *Comput. Methods Appl. Mech. Engrg.*, 306:342–363, 2016.
- [164] U. Langer and H. Yang. Robust and efficient monolithic fluid-structure-interaction solvers. *International Journal for Numerical Methods in Engineering*, 108(4):303–325, 2016.

- [165] U. Langer, S. Repin, and M. Wolfmayr. Functional a posteriori error estimates for time-periodic parabolic optimal control problems. *Numerical Functional Analysis and Optimization*, 37(10):1267–1294, 2016.
- [166] C. Hofer, U. Langer, and I. Touloupoulos. Discontinuous Galerkin isogeometric analysis of elliptic diffusion problems on segmentations with gaps. *SIAM Journal on Scientific Computing*, 38(6):A3430–A3460, 2016.
- [167] C. Hofer, U. Langer, and I. Touloupoulos. Discontinuous Galerkin isogeometric analysis on non-matching segmentation: Error estimates and efficient solvers. RICAM Report 2016-23, Johann Radon Institute for Computational and Applied Mathematics, Austrian Academy of Sciences, 2016. available at <http://www.ricam.oeaw.ac.at/files/reports/16/rep16-23.pdf>.
- [168] C. Hofreither, U. Langer, and S. Weisser. Convection-adapted BEM-based FEM. *Z. Angew. Math. Mech. (ZAMM)*, 96(12):1467–1481, 2016.
- [169] C. Hofer and U. Langer. Dual-primal isogeometric tearing and interconnecting methods. In P. Neittanmakki, J. Periaux, and O. Pironneau, editors, *Contributions to PDE for Applications*, Springer-ECCOMAS series "Computational Methods in Applied Sciences". Springer, Berlin, Heidelberg, New York, 2016. to appear.
- [170] C. Hofer and U. Langer. Dual-Primal Isogeometric Tearing and Interconnecting solvers for multipatch continuous and discontinuous Galerkin IgA equations. *PAMM*, 16(1):747–748, 2016.
- [171] U. Langer, S. Matculevich, and S. Repin. A posteriori error estimates for space-time iga approximations to parabolic initial boundary value problems. Technical report, 2016. arXiv:1612.08998 [math.NA].
- [172] C. Hofer and U. Langer. Dual-primal isogeometric tearing and interconnecting solvers for multipatch dG-IgA equations. *Comput. Methods Appl. Mech. Engrg.*, 316:2–21, 2017.
- [173] A. Mantzaflaris, B. Jüttler, B. Khoromskij, and U. Langer. Low rank tensor methods in Galerkin-based isogeometric analysis. *Computer Methods in Applied Mechanics and Engineering*, 316:1062–1085, 2017.
- [174] U. Langer, S. Repin, and T. Samrowski. A posteriori estimates for a coupled piezoelectric model. *Russ. J. Numer. Anal. Math. Modelling*, 32(4):259–266, 2017.
- [175] U. Langer and H. Yang. Recent development of robust monolithic fluid-structure interaction solvers. In S. Frei, B. Holm, T. Richter, T. Wick, and H. Yang, editors, *Fluid-Structure Interaction: Modeling, Adaptive Discretizations and Solvers*, volume 20 of *Radon Series on Computational and Applied Mathematics*, chapter 5, pages 169–191. de Gruyter, Berlin, Boston, 2017.

- [176] U. Langer, M. Neumüller, and I. Touloupoulos. Multipatch space-time isogeometric analysis of parabolic diffusion problems. In I. Lirkov and S. Margenov, editors, *Large-Scale Scientific Computing (LSSC 2017)*, volume 10665 of *Lecture Notes in Computer Science (LNCS)*, pages 21–32. Springer-Verlag, 2018. also available as RICAM Report 2017-18 at <https://www.ricam.oeaw.ac.at/files/reports/17/rep17-18.pdf> and NuMa Report 2017-03 at <http://www.numa.uni-linz.ac.at/publications/List/2017/2017-03.pdf>.
- [177] U. Langer, S. Matculevich, and S. Repin. Functional type error control for stabilised space-time iga approximations to parabolic problems. In I. Lirkov and S. Margenov, editors, *Large-Scale Scientific Computing (LSSC 2017)*, volume 10665 of *Lecture Notes in Computer Science (LNCS)*, pages 55–65. Springer-Verlag, 2018. also available as RICAM Report 2017-14 at <https://www.ricam.oeaw.ac.at/files/reports/17/rep17-14.pdf>.
- [178] U. Langer and M. Neumüller. Direct and iterative solvers. In M. Kaltenbacher, editor, *Computational Acoustics*, volume 579 of *CISM International Centre for Mechanical Sciences: Courses and Lectures*, pages 205–251. Springer-Verlag, 2017.
- [179] C. Hofer, U. Langer, M. Neumüller, and I. Touloupoulos. Time-multipatch discontinuous Galerkin space-time isogeometric analysis of parabolic evolution problems. *Electronic Transactions on Numerical Analysis*, 49:126–150, 2018.
- [180] U. Langer, W. Amrhein, and W. Zulehner, editors. *Scientific Computing in Electrical Engineering, SCEE 2016, St. Wolfgang, Austria, October 2016*, volume 28 of *Mathematics in Industry*, Cham, Schweiz, 2018. Springer International Publishing.
- [181] P. Gangl and U. Langer. A local mesh modification strategy for interface problems with application to shape and topology optimization. In U. Langer, W. Amrhein, and W. Zulehner, editors, *Scientific Computing in Electrical Engineering, SCEE 2016, St. Wolfgang, Austria, October 2016*, volume 28 of *Mathematics in Industry*, pages 147–155, Cham, Schweiz, 2018. Springer International Publishing.
- [182] C. Hofer, U. Langer, and M. Neumüller. Robust preconditioning for space-time isogeometric analysis of parabolic evolution problems. [math.NA] arXiv:1802.09277, arXiv.org, 2018.
- [183] B. Endtmayer, U. Langer, and T. Wick. Multiple goal-oriented error estimates applied to 3d non-linear problems. *PAMM*, 18(1):xx–yy, 2018. first published online, 17 Dec. 2018, <https://doi.org/10.1002/pamm.201800048>.
- [184] U. Langer and H. Yang. BDDC preconditioners for a space-time finite element discretization of parabolic problems. [math.NA] arXiv:1810.12159, arXiv.org, 2018.

- [185] C. Hofer, U. Langer, and S. Takacs. Inexact dual-primal isogeometric tearing and interconnecting methods. In P.E. Bjrstad, S.C. Brenner, L. Halpern, H.H. Kim, R. Kornhuber, T. Rahman, and O.B. Widlund, editors, *Domain Decomposition Methods in Science and Engineering XXIV*, volume 125 of *Lecture Notes in Computational Science and Engineering*, pages 393–403, Cham, 2018. Springer International Publishing.
- [186] M. Dauge, U. Langer, P. Monk, and D. Pauly, editors. *Mathematical and Numerical Analysis of Maxwell's Equations*, volume 15 of *Oberwolfach Reports*, Berlin, 2018. MFO, European Mathematical Society. Report 57, pp. 3349–3374.
- [187] C. Hofer and U. Langer. Dual-primal isogeometric tearing and interconnecting methods. In B.N. Chetverushkin, W. Fitzgibbon, Y.A. Kuznetsov, P. Neittanmakki, J. Periaux, and O. Piroeau, editors, *Contributions to Partial Differential Equations and Applications*, volume 47 of *Springer-ECCOMAS series "Computational Methods in Applied Sciences"*, pages 273–296. Springer International Publishing, Cham, Switzerland, 2019.
- [188] D. Jodlbauer, U. Langer, and T. Wick. Parallel block-preconditioned monolithic solvers for fluid-structure-interaction problems. *International Journal for Numerical Methods in Engineering*, 117:623–643, 2019.
- [189] Th. Apel, U. Langer, A. Meyer, and O. Steinbach, editors. *Advanced Finite Element Methods with Applications: Selected Papers from the 30th Chemnitz Finite Element Symposium 2017*, volume 128 of *Lecture Notes in Computational Science and Engineering*, Cham, 2019. Springer Nature Switzerland AG.
- [190] C. Hofer, U. Langer, and I. Touloupoulos. Isogeometric analysis on non-matching segmentation: Discontinuous Galerkin techniques and efficient solvers. *Journal of Applied Mathematics and Computing*, 61(1-2):297–336, 2019.
- [191] U. Langer, D. Pauly, and S. Repin, editors. *Maxwells Equations: Analysis and Numerics*, Radon Series on Computational and Applied Mathematics, Berlin, 2019. de Gruyter.
- [192] U. Langer and O. Steinbach, editors. *Space-Time Methods: Applications to Partial Differential Equations*, volume 25 of *Radon Series on Computational and Applied Mathematics*, Berlin, 2019. de Gruyter.
- [193] U. Langer, S. Matculevich, and S. Repin. Adaptive space–time Isogeometric Analysis for parabolic evolution problems. In U. Langer and O. Steinbach, editors, *Space–Time Methods: Applications to Partial Differential Equations*, volume 25 of *Radon Series on Computational and Applied Mathematics*, pages 155–200. de Gruyter, Berlin, 2019.
- [194] C. Hofer, U. Langer, M. Neumüller, and R. Schneckenleitner. Parallel and robust preconditioning for space-time isogeometric analysis of parabolic evolution problems. *SIAM Journal on Scientific Computing*, 41(3):A1793–A1821, 2019.

- [195] U. Langer, S. Matculevich, and S. Repin. Guaranteed error bounds and local indicators for adaptive solvers using stabilised space-time IgA approximations to parabolic problems. *Computers and Mathematics with Applications*, 78:2641–2671, 2019.
- [196] U. Langer, M. Neumüller, and A. Schafelner. Space-time finite element methods for parabolic evolution problems with variable coefficients. In T. Apel, U. Langer, A. Meyer, and O. Steinbach, editors, *Advanced Finite Element Methods with Applications - Selected Papers from the 30th Chemnitz Finite Element Symposium 2017*, volume 128 of *Lecture Notes in Computational Science and Engineering (LNCSE)*, chapter 13, pages 229–256. Springer, Berlin, Heidelberg, New York, 2019.
- [197] U. Langer and A. Schafelner. Adaptive space-time finite element solvers for parabolic initial-boundary value problems with non-smooth solutions. *PAMM*, 1(19):e201900305, 2019.
- [198] B. Endtmayer, U. Langer, I. Neitzel, T. Wick, and W. Wollner. Mesh adaptivity and error estimates applied to a regularized p-laplacian constrained optimal control problem for multiple quantities of interest. *PAMM*, 19(1):e201900231, 2019.
- [199] S. Kyas, U. Langer, and S. Repin. Adaptive space-time isogeometric analysis of parabolic equations. In A. Kunoth C. Manni A. Buffa, T. Hughes, editor, *Report No. 33 /2019 on the Workshop on "Mathematical Foundations of Isogeometric Analysis", 14 – 20 July 2019, Oberwolfach, Germany*, volume 16 of *Oberwolfach Reports*, pages 1981–2032, 2019.
- [200] S. Kyas, U. Langer, and S. Repin. Space-time isogeometric analysis of parabolic diffusion problems in moving spatial domains. *PAMM*, 19(1):e201900504, 2019.
- [201] B. Endtmayer, U. Langer, and T. Wick. Multigoal-oriented error estimates for non-linear problems. *Journal of Numerical Mathematics*, 27(4):215–236, 2019.
- [202] B. Endtmayer, U. Langer, I. Neitzel, W. Wollner, and T. Wick. Multigoal-oriented optimal control problems with nonlinear PDE constraints. *Computers and Mathematics with Applications*, 79(10):3001–3026, 2020.
- [203] B. Endtmayer, U. Langer, and T. Wick. Two-side a posteriori error estimates for the DWR method. *SIAM Journal on Scientific Computing*, 42(1):A371–A394, 2020.
- [204] D. Jodlbauer, U. Langer, and T. Wick. Parallel matrix-free higher-order finite element solvers for phase-field fracture problems. *Mathematical and Computational Applications*, 25(3):40, 2020. (article number: 40. <https://doi.org/10.3390/mca25030040>).

- [205] P. Gangl, U. Langer, A. Mantzaflaris, and R. Schneckeleitner. Isogeometric simulation and shape optimization with applications to electrical machines. In G. Nicosia and V. Romano, editors, *Scientific Computing in Electrical Engineering: SCEE 2018, Taormina, Italy, September 2018*, volume 32 of *The European Consortium for Mathematics in Industry*, pages 35–43. Springer International Publishing, 2020.
- [206] B. Endtmayer, U. Langer, J.P. Thiele, and T. Wick. Hierarchical DWR error estimates for the Navier-Stokes equation: h and p enrichment. In F.J. Vermolen and C. Vuik, editors, *Numerical Mathematics and Advanced Applications (ENUMATH 2019)*, volume 139 of *Lecture Notes in Computational Sciences and Engineering*, 2020.
- [207] U. Langer and A. Schafelner. Adaptive space-time finite element methods for non-autonomous parabolic problems with distributional sources. *Computational Methods in Applied Mathematics*, 20(4):677–693, 2020.
- [208] U. Langer and A. Schafelner. Space-time finite element methods for parabolic initial-boundary value problems with non-smooth solutions. In I. Lirkov and S. Margenov, editors, *Large-Scale Scientific Computing. LSSC 2019*, volume 11958 of *Lecture Notes in Computer Science*, pages 593–600, Cham, 2020. Springer.
- [209] D. Jodlbauer, U. Langer, and T. Wick. Matrix-free multigrid solvers for phase-field fracture problems. *Computer Methods in Applied Mechanics and Engineering*, 372:113431, 2020.
- [210] U. Langer, O. Steinbach, F. Tröltzsch, and H. Yang. Unstructured space-time finite element methods for optimal control of parabolic equation. *SIAM Journal on Scientific Computing*, 43(2):A744–A771, 2021.
- [211] U. Langer, O. Steinbach, F. Tröltzsch, and H. Yang. Space-time finite element discretization of parabolic optimal control problems with energy regularization. *SIAM Journal on Numerical Analysis*, 59(2):660–674, 2021.
- [212] B. Endtmayer, U. Langer, and T. Wick. Reliability and efficiency of DWR-type a posteriori error estimates with smart sensitivity weight recovering. *Comput. Methods Appl. Math.*, 21(2):351–371, 2021.
- [213] U. Langer and M. Zank. Efficient direct space-time finite element solvers for parabolic initial-boundary value problems in anisotropic sobolev spaces. *SIAM Journal on Scientific Computing*, 43(4):A2714A2736, 2021.
- [214] U. Langer, O. Steinbach, and H. Yang. Robust discretization and solvers for elliptic optimal control problems with energy regularization. *Comput. Meth. Appl. Math.*, 22(1):97–111, 2022.

- [215] U. Langer and A. Schafelner. Simultaneous space-time finite element methods for parabolic optimal control problems. In I. Lirkov and S. Margenov, editors, *Large-Scale Scientific Computing, 13th International Conference, LSSC 2021, Sozopol, Bulgaria, June 7–11, 2021 Revised Selected Papers*, volume 13127 of *Lecture Notes in Computer Science (LNCS)*, pages 314–321, Cham, Switzerland, 2022. Springer.
- [216] U. Langer, O. Steinbach, F. Tröltzsch, and H. Yang. Unstructured space-time finite element methods for optimal sparse control of parabolic equations. In D. Kalise G. Stadler E. Trélat R. Herzog, M. Heinkenschloss, editor, *Optimization and Control for PDEs*, volume 29 of *Radon Series on Computational and Applied Mathematics (RSCAM)*, chapter 8, pages 167–188. de Gruyter, Berlin, Boston, 2022.
- [217] U. Langer, A. Schafelner, O. Steinbach, F. Tröltzsch, and H. Yang. Adaptive space-time finite element methods for parabolic optimal control problems. In S. Sauter C. Wieners S. Larsson, R. Nochetto, editor, *Report No. 06/2022 on the Workshop on "Space-Time Methods for Time-Dependent Partial Differential Equations", 6 – 12 February 2022, Oberwolfach, Germany*, Oberwolfach Reports, pages 352–355, 2022. Report No. 6/2022, DOI: 10.4171/OWR/2022/6.
- [218] U. Langer and A. Schafelner. Adaptive space-time finite element methods for parabolic optimal control problems. *Journal of Numerical Mathematics*, 30(4):247–266, 2022.
- [219] U. Langer, O. Steinbach, F. Tröltzsch, and H. Yang. Space-time finite element methods for the initial temperature reconstruction. In S.C. Brenner, E. Chung, A. Klawonn, F. Kwok, J. Xu, and J. Zou, editors, *Domain Decomposition Methods in Science and Engineering XXVI*, volume 145 of *Lecture Notes in Computational Science and Engineering*, pages 617–624, Cham, 2022. Springer International Publishing.
- [220] D. Jodlbauer, U. Langer, and T. Wick. Efficient monolithic solvers for fluid-structure interaction applied to flapping membranes. In S.C. Brenner, E. Chung, A. Klawonn, F. Kwok, J. Xu, and J. Zou, editors, *Domain Decomposition Methods in Science and Engineering XXVI*, volume 145 of *Lecture Notes in Computational Science and Engineering*, pages 327–335, Cham, 2022. Springer International Publishing.
- [221] U. Langer and A. Schafelner. Space-time hexahedral finite element methods for parabolic evolution problems. In S.C. Brenner, E. Chung, A. Klawonn, F. Kwok, J. Xu, and J. Zou, editors, *Domain Decomposition Methods in Science and Engineering XXVI*, volume 145 of *Lecture Notes in Computational Science and Engineering*, pages 515–322, Cham, 2022. Springer International Publishing.
- [222] U. Langer. Adaptive space-time finite element and isogeometric analysis. In S.C. Brenner, E. Chung, A. Klawonn, F. Kwok, J. Xu, and J. Zou, editors,

- Domain Decomposition Methods in Science and Engineering XXVI*, volume 145 of *Lecture Notes in Computational Science and Engineering*, pages 79–90, Cham, 2022. Springer International Publishing.
- [223] U. Langer, R. Löscher, O. Steinbach, and H. Yang. Robust finite element discretization and solvers for distributed elliptic optimal control problems. *Computational Methods in Applied Mathematics*, 23(4):989–1005, 2023.
- [224] U. Langer, R. Löscher, O. Steinbach, and H. Yang. Parallel iterative solvers for discretized reduced optimality systems. Technical Report arXiv:2312.12282, arXiv.org, 2023.
- [225] Z. Dostál, T. Kozubek, A. Klawonn, U. Langer, L. F. Pavarino, and O. B. Widlund J. Šístek, editors. *Domain Decomposition Methods in Science and Engineering XXVII*, volume 140 of *Lecture Notes in Computational Science and Engineering*, Heidelberg, 2024. Springer.
- [226] B. Endtmayer, U. Langer, T. Richter, A. Schafelner, and T. Wick. A posteriori single- and multi-goal error control and adaptivity for partial differential equations. Technical Report arXiv:2404.01738, arXiv.org, 2024. accepted as Chapter 10 in the *Advances in Applied Mechanics (AAMS)*, Vol. 59, "Error control, adaptive discretizations, and applications" Part 2, ed. by F. Chouly, S.P.A. Bordas, R. Becker, R. and P. Omnes.
- [227] U. Langer, R. Löscher, O. Steinbach, and H. Yang. Robust finite element solvers for distributed hyperbolic optimal control problems. Technical Report arXiv:2404.03756, arXiv.org, 2024.
- [228] U. Langer, O. Steinbach, and H. Yang. Robust space-time finite element error estimates for parabolic distributed optimal control problems with energy regularization. *Advances in Computational Mathematics*, 50:24, 2024.
- [229] U. Langer, R. Löscher, O. Steinbach, and H. Yang. An adaptive finite element method for distributed elliptic optimal control problems with variable energy regularization. *Computers and Mathematics with Applications*, 160:1–14, 2024.
- [230] D. Jodlbauer, U. Langer, T. Wick, and W. Zulehner. Matrix-free monolithic multigrid methods for Stokes and generalized Stokes problem. *SIAM Journal on Scientific Computing*, 46(3):A1599–A1627, 2024.
- [231] B. Endtmayer, U. Langer, and A. Schafelner. Goal-oriented adaptive space-time finite element methods for regularized parabolic p-Laplace problems. *Computers and Mathematics with Applications*, 167:286–297, 2024.
- [232] U. Langer, R. Löscher, O. Steinbach, and H. Yang. Robust iterative solvers for algebraic systems arising from elliptic optimal control problem. In I. Lirkov and S. Margenov, editors, *Large-Scale Scientific Computing, 14th International*

Conference, LSSC 2023, Sozopol, Bulgaria, June 5–9, 2023 Revised Selected Papers, volume 13952 of *Lecture Notes in Computer Science (LNCS)*, pages 35–43, Cham, Switzerland, 2024. Springer.

- [233] U. Langer, R. Löscher, O. Steinbach, and H. Yang. Mass-lumping discretization and solvers for distributed elliptic optimal control problems. *Numer. Linear Algebra Appl.*, page e2564, 2024.