

Igor Tsukerman

The University of Toronto, Canada (1990 – 1995)

List of Publications

(Reprints of most papers available upon request)

Books

Igor Tsukerman, [*Computational Methods for Nanoscale Applications: Particles, Plasmons, and Waves*](#). Springer, Nanostructure Science and Technology series, 2007.

[Second edition to be published in 2020.]

[*Compendium on Electromagnetic Analysis. From Electrostatics to Photonics: Fundamentals and Applications for Physicists and Engineers \(in 5 Volumes\)*](#). December 2019. Editor-in-chief: Igor Tsukerman

[*Plasmonics and Plasmonic Metamaterials: Analysis and Applications*](#). Gennady Shvets, Igor Tsukerman (Eds.). World Scientific Publishing Company, 2011.

Book Chapters

1. Fritz Kretzschmar, Sascha M. Schnepf, Herbert Egger, Farzad Ahmadi, Nabil Nowak, Vadim A. Markel, Igor Tsukerman, . The power of Trefftz approximations: Finite difference, boundary difference and discontinuous Galerkin methods; nonreflecting conditions and non-asymptotic homogenization. *Lecture Notes in Computer Science*, v. 9045, pp. 50-61, 2015.
2. Gennady Shvets, Igor Tsukerman, Preface to *Plasmonics and Plasmonic Metamaterials: Analysis and Applications*, World Scientific Publishing Co., 2011, pp. xiii–xvii.
3. Masha Sosonkina and Igor Tsukerman, [*Parallel solvers for flexible approximation schemes in multiparticle simulation*](#), *Lecture Notes in Computer Science*, Springer: Berlin / Heidelberg, vol. 3991 (eds. Vassil N. Alexandrov, Geert Dick van Albada, Peter M.A. Sliot, Jack Dongarra), pp. 54–62, 2006. ISBN: 3-540-34379-2, ISSN: 0302-9743, DOI: 10.1007/11758501_12.
4. Achim Basermann, Igor Tsukerman, Parallel Generalized Finite Element Method for Magnetic Multiparticle Problems, *Springer*

21. X. Y. Z. Xiong, L. J. Jiang, V. A. Markel and I. Tsukerman. Surface waves in three-dimensional electromagnetic composites and their effect on homogenization, *Opt Express*, vol. 21, No. 9, pp. 10412–10421, 2013.
22. O. Alkhateeb, I. Tsukerman, A boundary difference method for electromagnetic scattering problems with perfect conductors and corners, *IEEE Trans on Antennas and Propagation*, vol. 61, No. 10, pp. 5117–5126, 2013.
23. D. H. Mac, S. Clenet, J. C. Mipo, I. Tsukerman, A priori error indicator in the transformation method for problems with geometric uncertainties, *IEEE Trans on Magn.*, vol. 49, No. 5, pp. 1597–1600, 2013.
24. Igor Tsukerman. Nonlocal homogenization of metamaterials by dual interpolation of fields. *JOSA B*, vol. 28, No. 12, pp. 2956–2965, 2011.
25. Ander24.

59. Igor Tsukerman and Alexander Plaks, Refinement strategies and approximation errors for tetrahedral elements, *IEEE Trans. Magn.*, vol. 35, No. 3, pp.1342–1345, 1999.
60. I.A.Tsukerman, Alexander Plaks, H.N. Bertram, Multigrid methods for computation of magnetostatic fields in magnetic recording problems, *J. Applied Phys.*, vol. 83, No. 11, pp.6344–6346, 1998.
61. I.A. Tsukerman, Alexander Plaks, Comparison of accuracy criteria for approximation of conservative fields on tetrahedra, *IEEE Trans. Magn.*, vol. 34, pp. 3252–3255, 1998.
62. I.A. Tsukerman, A general accuracy criterion for finite element approximation, *IEEE Trans. Magn.*, vol. 34, pp. 2425–2428, 1998.
63. I.A. Tsukerman, Approximation of conservative fields and the element ‘edge shape matrix’, *IEEE Trans. Magn.*, vol. 34, pp. 3248–3251, 1998.
64. I.A. Tsukerman, Stability of the moment method in electromagnetic problems, *IEEE Trans. Magn.*, vol. 33, No. 2, pp. 1402–1405, 1997.
65. I.A. Tsukerman, Accurate computation of ‘ripple solutions’ on moving finite element meshes, *IEEE Trans. Magn.*, vol. 31, No. 3, pp. 1472-1475, 1995.

78. G.M. Khutoretskii, V.D. Varshavskii, I.A. Zuckermann, Computation and analysis of high-power cryogenic turbogenerator rotor heating conditions, *Electric Technology U.S.S.R.* No.2, pp.69–75, 1985.
79. Yu.V. Rakitskii, E.D. Shchukin, V.S. Yushchenko, I.A. Tsukerman, Yu.B. Suris, A.I. Slutsker, Mechanism of the formation of energy fluctuation and a method for studying it, *Doklady. Physical chemistry: Proceedings of the Academy of Sciences of the USSR*, vol. 285, No. 4, pp.1204–1207, 1985. ISSN: 0012-5016.
80. Yu.V. Rakitskii, E.B. Belopol'skaya, Yu.P. Kizimovich, I.A. Tsukerman, Some iterative methods for solution of variational-difference analogs of steady-state field equations, *Power Engineering (USSR Academy of Sciences)*, vol. 24, No. 1, pp.67–76, 1986.
81. G.M. Khutoretsky, V.D. Varshavsky, I.A. Tsukerman, Computer modelling of rotor thermal field in large cryoturbogenerator, *Power Engineering (USSR)* 1987, No. 1, pp. 11–15.

92. Shamy Mansha, Osama Alkhateeb, Igor Tsukerman, and Y. D. Chong. Trefftz-based methods for electromagnetic wave scattering in aperiodic slabs. EMF'2018, Darmstadt, Germany, April 2018.
93. S. Mansha, Y.D. Chong, and I. Tsukerman. The FLAME-

111. Burak Tekgun, Yilmaz Sozer, Igor Tsukerman. Measurement of core losses in electrical steel in the saturation region under dc bias conditions. 30th Annual IEEE Applied Power Electronics Conference and Exposition (APEC). Charlotte, NC, March 2015.
112. Igor Tsukerman and Ralf Hiptmair, Finite difference schemes and nonreflecting boundary conditions, ICCP9, Singapore, January 2015.
113. Igor Tsukerman and Vadim A. Markel, A nonasymptotic homogenization theory of periodic electromagnetic structures, ICCP9, Singapore, January 2015.
114. Igor Tsukerman, Vadim Markel, Sascha Schnepf, Fritz Kretschmar. The power of Trefftz methods: from finite-difference to Discontinuous Galerkin schemes and from macromolecules to metamaterials (invited plenary talk). Sixth International Conference: Application of Mathematics in Technical and Natural Sciences. Albena, Bulgaria, June 2014. <http://2014.eac4amitans.eu/>
115. Igor Tsukerman, Osama AlKhateeb, Fritz Kretschmar, and Sascha Schnepf, Trefftz approximations: finite-difference, boundary-difference and Discontinuous Galerkin Schemes (invited plenary talk). Sixth Conference on Finite Difference Methods: Theory and Applications, Lozenetz, Bulgaria, June 2014.
116. Fritz Kretschmar, Farzad Ahmadi, Nabil Nowak, Sascha M Schnepf, Igor Tsukerman, Herbert Egger, Thomas Weiland. Trefftz Absorbing boundary conditions in analytical, Discontinuous Galerkin and finite difference form. International Conference on Electromagnetics in Advanced Applications (ICEAA), Aruba, August 2014. <http://www.iceaa-offshore.org/>
117. Igor Tsukerman, Vadim Markel. A nonasymptotic homogenization theory of electromagnetic metamaterials. International Conference on Electromagnetics in Advanced Applications (ICEAA), Aruba, August 2014. <http://www.iceaa-offshore.org/>
118. Herbert Egger, Fritz Kretschmar, Sascha M. Schnepf. Transparent boundary conditions for a discontinuous Galerkin Trefftz method. 4th European Seminar on Computing (ESCO). Pilsen, Czech Republic, June, 2014.
119. Fritz Kretschmar, Sascha M. Schnepf, Igor Tsukerman, and Thomas Weiland. The Discontinuous Galerkin – Trefftz method. FEM2014: The 12th International Workshop on Finite Elements for Microwave Engineering, Chengdu, China, May 2014. <http://www.fem2014.org/>
120. Vadim A. Markel, Igor Tsukerman, Xiaoyan Y. Z. Xiong, and Li Jun Jiang. Real-space vs Fourier-space homogenization of metamaterials. The 33rd PIERS Symposium, Taipei, Taiwan, March 2013. <http://piers.org/piers2013Taipei/>
121. Xiaoyan Y. Z. Xiong, Li Jun Jiang, Vadim A. Markel, and Igor Tsukerman. Surface waves in electromagnetic metamaterials and their effect on effective parameters. The 33rd PIERS Symposium, Taipei, Taiwan, March 2013. <http://piers.org/piers2013Taipei/>
122. Osama Alkhateeb and Igor Tsukerman. Special difference schemes for singularity-free boundary methods. The 33rd PIERS Symposium, Taipei, Taiwan, March 2013. <http://piers.org/piers2013Taipei/>
123. Igor Tsukerman. Finite difference–Trefftz schemes in electromagnetics. The 33rd PIERS Symposium, Taipei, Taiwan, March 2013. <http://piers.org/piers2013Taipei/>
124. Igor Tsukerman, Vadim A. Markel. Homogenization of metamaterials in Fourier and real spaces (invited). ICNP/AOM Conference, Hong Kong, May 2013. http://www.polyu.edu.hk/feng/icnp_aom2013
125. Xiaoyan Y.Z. Xiong, Li Jun Jiang, Vadim A. Markel, Igor Tsukerman. Position-dependent effective parameters of metamaterials. ICNP/AOM Conference, Hong Kong, May 2013 http://www.polyu.edu.hk/feng/icnp_aom2013

126. X. Y. Z. Xiong, L. J. Jiang, V. A. Markel, I. Tsukerman. Numerical methods for effective material parameters of periodic electromagnetic composites at the surface and in the bulk. ACES

144. František Čadež, Igor Tsukerman, Fritz Keilmann, and Rainer Hillenbrand, Finite element electrodynamic simulations in near-field infrared microscopy, Paper 6988-22, Photonics Europe, April 2008.
145. František Čadež and Igor Tsukerman, Flexible approximation schemes for wave refraction in negative index materials, 16th International Conference on the Computation of Electromagnetic Fields (Compumag), June 24–28, 2007, Aachen, Germany.
146. Jianhua Dai and Igor Tsukerman, Flexible approximation schemes with adaptive grid refinement, 16th International Conference on the Computation of Electromagnetic Fields (Compumag), June

159. D. Mehtani, N.H. Lee, R. Hartschuh, A. Kisliuk, M.D. Foster, A.P. Sokolov, Igor Tsukerman, Optical properties of the tips for apertureless near-field microscopy, Optics & Photonics 2005, San Diego CA, 31 July – 4 August 2005, <http://www.spie.org/Conferences/calls/05/am/>
160. Igor Tsukerman, Electromagnetic finite-difference analysis without the ‘staircase’ effect, 2005 IEEE/ACES International Conference on Wireless Communications and Applied Computational Electromagnetics, Honolulu HI, April 2005.
161. Igor Tsukerman, A new computational method for plasmon resonances of nanoparticles, 2005 IEEE/ACES International Conference on Wireless Communications and Applied Computational Electromagnetics, Honolulu HI, April 2005.
162. Igor Tsukerman, Gary Friedman, Derek Halverson, New computational methods for long-range

175. Alexander Plaks, Igor Tsukerman, G. Friedman, B. Yellen, Generalized Finite Element Method for magnetized nanoparticles, IEEE CEFC Conference, Perugia, Italy, June 2002. <http://www.ieeemagnetics.org/CEFC02/>
176. Igor Tsukerman, A Priori error estimates in conventional and generalized electromagnetic FEM, Compumag'2001, Panel Session, Evian, France, July 2001.
177. Leonid Proekt, Igor Tsukerman, Method of overlapping patches for electromagnetic computation, Compumag'2001, Evian, France, July 2001.
178. Leonid Proekt, Sergey Yuferev, Igor Tsukerman, Nathan Ida, Method of overlapping patches for electromagnetic computation near imperfectly conducting cusps and edges, Compumag'2001, Evian, France, July 2001.
179. I.A. Tsukerman, V.V. Dombrovski, Finite element simulation of time-dependent electromagnetic fields in the end zone of superconducting motors, Compumag'2001, Evian, France, July 2001.
180. Igor Tsukerman and Leonid B. Proekt, Generalized scalar and vector elements for electromagnetic computation, XI International Symposium on Theoretical Electrical Engineering, Linz, Austria, August 2001. <http://regpro.mechatronik.uni-linz.ac.at/istet/>
181. Igor Tsukerman, Finite Element Differential-Algebraic Systems for eddy current problems, Auckland Numerical Ordinary Differential Equations (ANODE), Auckland, New Zealand, January 2001. <http://www.math.auckland.ac.nz/~anode/ANODE2001/index.html>
182. Alexander Plaks, Igor Tsukerman, Adaptive multigrid methods for unbounded problems, with applications in geophysics, 16th IMACS World Congress 2000 on Scientific Computation, Applied Mathematics and Simulation, August 2000, Swiss Federal Institute of Technology.
183. Alexander Plaks, Igor Tsukerman, Adaptive mesh refinement in open boundary problems, 5th International Workshop on Finite Elements for Microwave Engineering, Boston, June 2000.
184. Alexander Plaks, Igor Tsukerman, Adaptive multigrid methods for open boundary problems in layered media, *IEEE CEFC h Conf*

191. Igor Tsukerman and Alexander Plaks, BPX-preconditioned fully adaptive multigrid for micromagnetic problems, *11th International Conference on Domain Decomposition*, Greenwich, UK, July 1998.
192. Igor Tsukerman and Alexander Plaks, Interpolation errors and two refinement strategies for tetrahedra, *11th International Conference on Domain Decomposition*, Greenwich, UK, July 1998.
193. Igor Tsukerman and Alexander Plaks, Hierarchical basis multilevel preconditioners for 3D magnetostatic problems, *IEEE CEFC Conference*, Tucson AZ, 1998.
194. Igor Tsukerman and Alexander Plaks, Refinement strategies and approximation errors for tetrahedral elements, *IEEE CEFC Conference*, Tucson AZ, 1998
195. I.A. Tsukerman, Alexander Plaks, H.N. Bertram, Multigrid methods for computation of magnetostatic fields in magnetic recording problems, *7th Joint MMM-Intermag Conference*, San Francisco, January 1998.
196. Igor Tsukerman, A. Bossavit, Shape of finite elements and approximation in electromagnetics, *IEEE CEFC Conference*, Palermo, Italy, June 1997.
197. I.A. Tsukerman, Alexander Plaks, Comparison of accuracy criteria for approximation of conservative fields on tetrahedra, *IEEE CEFC Conference*, Rio de Janeiro, 1997.
198. I.A. Tsukerman, A general accuracy criterion for finite element approximation, *IEEE CEFC Conference*, Rio de Janeiro, 1997.
199. I.A. Tsukerman, Approximation of conservative fields and the element 'edge shape matrix', *Compumag*, Rio de Janeiro, 1997.
200. I.A. Tsukerman, Stability of the moment method in electromagnetic problems, *IEEE CEFC Conference*, Okayama, Japan, March 1996. <http://www.eplab.elec.okayama-u.ac.jp/cefc.html>
201. I.A. Tsukerman, E. Sidoriak, J. D. Lavers, K. Weeber, H. Karmaker, Simulation of time-dependent fields and eddy currents with circuits and rotor motion in electrical machines, *Proceedings of Compumag'95*, Berlin, Germany, July 1995.
202. I.A. Tsukerman, J.D. Lavers, A. Konrad, K. Weeber, H. Karmaker, Finite element analysis of static and time-dependent fields and forces in a synchronous motor, *Proceedings of the International Conference on Electrical Machines*, Paris, France, 1994.
203. I.A. Tsukerman, Accurate computation of 'ripple solutions' on moving finite element meshes, *IEEE CEFC Conference*, Aix-les-Bains, France, 1994.
204. I.A. Tsukerman, J.D. Lavers, A. Konrad, Using complementary formulations for accurate computations of magnetostatic fields and forces in a synchronous motor, *IEEE CEFC Conference*, Miami, FL, November 1993.
205. I.A. Tsukerman, Application of multilevel preconditioners to finite element magnetostatic problems, *IEEE CEFC Conference*, Miami, FL, November 1993.
206. I.A. Tsukerman, Fast finite element solvers for problems with magnetic materials, *IEEE CEFC Conference*, Stockholm, Sweden, 1993.
207. I.A. Tsukerman, Node and edge element approximation of discontinuous fields and potentials, *IEEE CEFC Conference*, Stockholm, Sweden, 1993.
208. I.A. Tsukerman, A. Konrad, G. Meunier and J.C. Sabonnadiere, Coupled field-circuit problems: trends and accomplishments, *IEEE CEFC Conference*, Harvey Mudd College, Claremont, CA, August 1992.

