Boundary Element Methods: Derivation, Analysis, and Implementation

Ralf Hiptmair

Seminar for Applied Mathematics, ETH Zürich

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3. Boundary Element Methods

4. Calderón Preconditioning

5. In Depth: Novel BIE for Transmission Problems

   Chapter 5 not done by lack of time

Monographs & Textbooks

A Selection:

📄 W. HACKBUSCH, *Integral equations. Theory and numerical treatment.*, vol. 120 of International Series of Numerical Mathematics, Birkhäuser, Basel, 1995.

📄 G. C. HSIAO AND W. L. WENDLAND, *Boundary integral equations*, vol. 164 of Applied Mathematical Sciences, Springer-Verlag, Berlin, 2008.

📄 W. MCLEAN, *Strongly Elliptic Systems and Boundary Integral Equations*, Cambridge University Press, Cambridge, UK, 2000.

📄 S. SAUTER AND C. SCHWAB, *Boundary Element Methods*, vol. 39 of Springer Series in Computational Mathematics, Springer, Heidelberg, 2010.

📄 O. STEINBACH, *Numerical approximation methods for elliptic boundary value problems*, Springer, New York, 2008.

Electromagnetic BIE & BEM

Some articles:

- 📄 A. BUFFA, *Remarks on the discretization of some non-positive operators with application to heterogeneous Maxwell problems*, SIAM J. Numer. Anal., 43 (2005), pp. 1–18.

- 📄 A. BUFFA AND R. HIPTMAIR, *Galerkin boundary element methods for electromagnetic scattering*, in Topics in Computational Wave Propagation. Direct and inverse Problems, M. Ainsworth, P. Davis, D. Duncan, P. Martin, and B. Rynne, eds., vol. 31 of Lecture Notes in Computational Science and Engineering, Springer, Berlin, 2003, pp. 83–124.

- 📄 A. BUFFA, R. HIPTMAIR, T. VON PETERSDORFF, AND C. SCHWAB, *Boundary element methods for Maxwell transmission problems on Lipschitz domains*, Numer. Math., 95 (2003), pp. 459–485.

- 📄 R. HIPTMAIR AND C. SCHWAB, *Natural boundary element methods for the electric field integral equation on polyhedra*, SIAM J. Numer. Anal., 40 (2002), pp. 66–86.

Calderón Preconditioning

Some articles:

📄 F. ANDRIULLI, K. COOLS, H. BAGCI, F. OLYSLAGER, A. BUFFA, S. CHRISTIANSEN, AND E. MICHIELSSEN, *A multiplicative Calderon preconditioner for the electric field integral equation*, IEEE Trans. Antennas and Propagation, 56 (2008), pp. 2398–2412.

📄 A. BUFFA AND S. CHRISTIANSEN, *A dual finite element complex on the barycentric refinement*, Math. Comp., 76 (2007), pp. 1743–1769.

📄 R. HIPTMAIR, *Operator preconditioning*, Computers and Mathematics with Applications, 52 (2006), pp. 699–706.

📄 O. STEINBACH AND W. WENDLAND, *The construction of some efficient preconditioners in the boundary element method*, Adv. Comput. Math., 9 (1998), pp. 191–216.

Transmission Problems

Some articles:

📄 X. CLAEYS, R. HIPTMAIR, AND C. JEREZ-HANCKES, *Multi-trace boundary integral equations*, in Direct and Inverse Problems in Wave Propagation and Applications, I. Graham, U. Langer, J. Melenk, and M. Sini, eds., vol. 14 of Radon Series on Computational and Applied Mathematics, De Gruyter, Berlin/Boston, 2013, pp. 51–100.

📄 X. CLAEYS, R. HIPTMAIR, C. JEREZ-HANCKES, AND S. PINTARELLI, *Novel multi-trace boundary integral equations for transmission boundary value problems*, in Unified Transform for Boundary Value Problems: Applications and Advances, A. Fokas and B. Pelloni, eds., SIAM, Philadelphia, 2014, pp. 227–258.

📄 X. CLAEYS, R. HIPTMAIR, AND E. SPINDLER, *A second-kind Galerkin boundary element method for scattering at composite objects*, BIT Numerical Mathematics, 55 (2015), pp. 33–57.

📄 X. CLAEYS, R. HIPTMAIR, AND E. SPINDLER, *Second-kind boundary integral equations for electromagnetic scattering at composite objects*, Computers & Mathematics with Applications, 74 (2017), pp. 2650–2670.