Minisymposium MS1: Efficient solvers for Maxwell equations

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Abstract

Maxwell equations are a coupled system of partial differential equations to describe phenomena in electrodynamics with numerous applications. Due to their structure, conformal discretizations with suitable finite elements need more care than for standard elliptic equations. A further challenge is the robust and efficient numerical solution of the resulting huge system of algebraic equations. Due to its Helmholtz like structure as in the time harmonic Maxwell case, standard solvers for uniformly elliptic equations do not work as well as in the elliptic case. Therefore, it is still a very active research area to develop efficient iterative solvers for such problems. Even more, due to new developments in physics and engineering, for instance, optics, there is currently an emerging interest. Specifically, finite element discretizations and the corresponding (parallel) numerical solutions of the time harmonic Maxwell equations pose challenges. In this minisymposium, recent theoretical and practical developments of the aforementioned themes will be brought together with an emphasis on:

- Overlapping and nonoverlapping domain decomposition methods,
- Optimized Schwarz solvers,
- Techniques from boundary element methods and $\mathcal{H}$ matrix preconditioning,
- Parallelization,
- Solvers for Discontinuous Galerkin discretizations.

Speaker

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