Recent advances in robust and efficient preconditioning methods

(devoted to Owe Axelsson on the ocassion of his significant birthday)

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Abstract:

Mathematical models in state-of-the-art scientific computing applications are getting more and more complex. Typically they find their formulations in coupled systems of partial differential equations that describe physical processes across different spatial and temporal scales. Their reliable and accurate numerical simulation very often requires highly specialized discretization techniques, e.g., nonconforming, mixed, stabilized, conservative, (hybridized) discontinuous Galerkin, adaptive, higher-order, or space-time finite element methods that still make the efficient and robust solution of the arising discrete problems a challenging task.

This minisymposium focuses on recent advances in the design, implementation, and analysis of efficient and parameter-robust iterative solvers and preconditioners for highly ill-conditioned systems of linear algebraic equations, in particular indefinite systems, and systems of single or multiple saddle-point form.