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Joint work with
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Preconditioning linear systems in PDE-constrained optimization by parallel aggregation-based multilevel methods

PDE-constrained optimization problems arise in a variety of applications, e.g., definition of optimal trajectories, shape design, control of chemical processes, control of bio-chemical systems, just to name a few. Their solution is a demanding task, requiring accurate and robust numerical methods as well as high-performance computing resouces. In this talk, we focus on the development of parallel multilevel domain-decomposition preconditioners for large-scale linear systems that result from the discretization of the optimality conditions associated with optimal control problems governed by elliptic PDEs. The interest for such methods is motivated by their optimal convergence properties, robustness and good scalability. We present parallel algebraic multilevel preconditioners based on the additive Schwarz methods and on a modification of the smoothed aggregation coarsening technique. With this modification, the restriction and prolongation operators are independent of the regularization parameter in the cost functional and are cheaper to compute. The parallel preconditioners are formulated in terms of parallel sparse basic linear algebra kernels and they have been implemented within the framework of the package MLD2P4 (MultiLevel Domain Decomposition Parallel Preconditioners Package based on PSBLAS). The results of numerical experiments, where the preconditioners are coupled with the BiCGStab solver, show the effectiveness of our approach.

Ort: Raum 02.003 (2. Stock) (Mathegeb. 30 West)   Zeit: Freitag, 20.05.2011, um 11.00 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.

gez. Alfio Borzi