Additive Multilevel-Preconditioners based on Bilinear Interpolation, Matrix Dependent Geometric Coarsening and Algebraic-Multigrid Coarsening for Second Order Elliptic PDEs

Abstract:
In this paper, we study additive multilevel preconditioners based on bilinear interpolation, matrix dependent interpolations and the algebraic multigrid approach. We consider 2nd order elliptic problems, i.e. strong elliptic ones, singular perturbation problems and problems with locally strongly varying or discontinuous coefficient functions. We report on the results of our numerical experiments which show that especially the algebraic multigrid based method is mostly robust also in the additive case.

Stichworte:
additive multilevel-preconditioners; matrix dependent geometric coarsening; algebraic-multigrid coarsening; second order elliptic partial differential equations