

Coarsening-Based Algebraic Multi-Level Preconditioners

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Multilevel preconditioning techniques that are based on purely algebraic considerations have yielded fairly robust methods and have gained much attention in recent years. This talk will begin by an overview of the general framework of these well-known techniques. Then I will present an alternative viewpoint within the same framework which is based on "graph coarsening". Graph coarsening provides a natural way to define a divide and conquer strategy for building good preconditioners. The simplest of these techniques is to exploit coarsening as a form of reordering for ILUT. When combined with proper coarsening criteria this in itself yields very effective techniques. We will also discuss more elaborate multilevel techniques based on coarsening. Tests and comparisons with ILUT and ARMS will be presented.