

Algebraic Multigrid methods based on the GLT theory

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ABSTRACT

In this talk, based on the generalized locally Toeplitz (GLT) theory, we present a framework to construct an algebraic multigrid (AMG) solver for matrices with Toeplitz structure.

We recall the basics of the AMG algorithm and of the GLT theory, together with the properties of a Toeplitz matrix. Based on GLT we show how to construct an AMG solver for such matrices (GLT-MG) and discuss its main advantages: substantially less memory demands and higher computational efficiency while preserving the optimal convergence rate of a conventional AMG. Finally we illustrate implementation considerations based on the underlying matrix structures and show some numerical experiments.