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**An adaptive AMG coarsening algorithm based on  
compatible relaxation**

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Algebraic multigrid (AMG) is an effective solver for many of the large, sparse linear systems arising from the discretization of PDEs. There remain, however, large classes of problems for which the classical AMG heuristics, based on the concepts of "strength of connection" and "algebraic smoothness", break down, yielding suboptimal performance. Recent efforts attempt to overcome such difficulties by adaptively constructing the components of an AMG algorithm. We present an adaptive AMG coarsening algorithm based on compatible relaxation along with preliminary numerical results.

This work is an ongoing collaboration with Marian Brezina, Tom Manteuffel, Scott MacLachlan, Steve McCormick, and John Ruge at CU Boulder, Oren Livne at Stanford, and Rob Falgout at CASC-LLNL.