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Algebraic Multigrid (AMG) - Beyond the M-Matrix case

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Algebraic Multigrid methods (AMG) are known to be robust linear solvers for a wide class of linear systems arising from the discretization of partial differential equations. However, the construction as well as the convergence analysis of classical AMG methods is based on the assumption that the linear system matrix is a symmetric positive definite M-matrix.

In this talk we present an approach to extend the applicability of AMG to a wider class of problems. In particular, we focus on higher-order prolongation schemes to obtain a more accurate representation of the smooth error components.