

Adaptive Algebraic Multigrid for Singular Value and Tensor Decompositions

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An adaptive algebraic multigrid (AMG) method is presented for the rank- K canonical tensor decomposition problem, which aims to approximate a data tensor by a sum of K rank-one terms. This canonical tensor decomposition is widely used in a variety of application areas that include chemometrics, signal processing, neuroscience, and social network analysis. An adaptive version of AMG is required for this problem to ensure that error components that converge slowly during relaxation lie approximately in the range of interpolation. The method uses the bootstrap adaptive AMG approach and is derived by first considering an adaptive AMG method for the singular value decomposition, which is the matrix version of canonical tensor decomposition.