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Dynamic mesh adaptation for multi-material simulations using weighted condition number relaxation[1] PATRICK GREENE, SAM SCHOFIELD, ROBERT NOURGALIEV, Lawrence Livermore National Laboratory — A mesh smoothing method designed to cluster cells near a dynamically evolving interface is presented. The method is based on weighted condition number mesh relaxation with the weight function being computed from either a level set or volume fraction representation of the interface. The weight function is expressed as a Taylor series based discontinuous Galerkin (DG) projection, which makes the computation of the derivatives of the weight function needed during the condition number optimization process a trivial matter. The method retains the excellent smoothing capabilities of condition number relaxation, while providing a method for clustering mesh cells near regions of interest requiring increased resolution. The algorithm has recently been implemented in one of LLNLs arbitrary Lagrangian Eulerian (ALE) production codes. Results for a number of multi-material problems are presented, which will demonstrate the methods great potential as a mesh relaxer for ALE simulations.

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