
Ilya Lashuk
**Element agglomeration coarsening of high-order
H(div)-conforming finite element spaces**

Lawrence Livermore National Laboratory
7000 East Ave L-560
Livermore
CA
94550
`lashuk2@llnl.gov`
Panayot Vassilevski

We present an element agglomeration construction of coarse subspaces of next-to-the-lowest order Raviart-Thomas finite element spaces on unstructured meshes in three dimensions. The agglomerated elements, which serve as coarse elements, and the interfaces between them can have arbitrary (irregular) shape. Our construction ensures that vector linear functions are exactly interpolated on each agglomerated element. We additionally discuss recursive construction of pairs of nested coarse spaces in the context of deriving coupled multilevel preconditioners for the saddle-point problems arising in the mixed finite element discretization of second order elliptic equations.