BEM-based FEM for Helmholtz and Maxwell equations on arbitrary polyhedral meshes

Dylan Copeland[1]

We present new finite element methods for the Helmholtz and Maxwell equations on arbitrary three-dimensional polyhedral meshes, with boundary elements on the surfaces of the polyhedral elements. The methods are based on domain decomposition techniques, treating the polyhedral elements as subdomains. On a triangular mesh of the skeleton, we use the lowest order polynomial spaces and obtain sparse, symmetric linear systems despite the use of boundary elements. Moreover, piecewise constant coefficients are permissible. The resulting approximation on the skeleton mesh can be extended throughout the domain via representation formulas.

[1]RICAM, Linz, Austria,
dylan.copeland@oeaw.ac.at