MORTAR COUPLINGS OF DISCONTINUOUS GALERKIN AND MIXED FINITE ELEMENT METHODS

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ABSTRACT

Discontinuous Galerkin (DG) and mixed finite element (MFE) methods are two popular methods that possess local mass conservation. In this talk we present DG-DG and DG-MFE domain decomposition couplings using mortar finite elements to impose weak continuity of fluxes and pressures on the interface. The subdomain grids need not match and the mortar grid may be much coarser, giving a two-scale method. Convergence results in terms of the fine subdomain scale h and the coarse mortar scale H are established for both types of couplings. In addition, a non-overlapping parallel domain decomposition algorithm is developed, which reduces the coupled system to an interface mortar problem. The properties of the interface operator are analyzed. Computational results for flow in porous media are presented.

This is a joint work with Vivette Girault (Paris VI), Shuyu Sun (Clemson), and Mary Wheeler (UT Austin). The computational results have been obtained by Gergina Pencheva and Sunil Thomas (UT Austin).

REFERENCES

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