Hybrid methods for Multiscale Problems

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ABSTRACT

 We shall discuss some basic ideas regarding the Multiscale Hybrid Mixed (MHM) method, a Domain Decomposition scheme designed to solve multiscale partial differential equations (PDEs) in parallel [1]. As originally proposed, the MHM method starting point is a primal hybrid formulation, which is then manipulated to result in an efficient method that is based on local independent PDEs and a global problem that is posed on the skeleton of the finite element mesh. Recasting the MHM method in a more general framework, we investigate some conditions that yield a well-posed method. We apply the general ideas to different formulations, and, in particular, come up with an interesting and fruitful connection between the Multiscale Finite Element Method [2] and a dual hybrid method. Finally, we propose a method that combines the main ideas of the Discontinuous Enrichment Method [3] and the MHM method.

REFERENCES

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