

Multiscale Hybrid-Mixed Method for Porous Media Problems

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ABSTRACT

Multiscale Hybrid-Mixed (MHM) finite element method have been recently developed for several operators, including hydro-dynamics and reaction-advection-diffusion models. The MHM method is a consequence of a hybridization procedure, and emerges as a method that naturally incorporates multiple scales while provides solutions with high-order precision. The computation of local problems is embedded in the upscaling procedure, which are completely independent and thus may be naturally obtained using parallel computation facilities. We conclude that the MHM method is naturally shaped to be used in parallel computing environments and appears to be a highly competitive option to handle realistic multiscale parabolic boundary value problems with precision on coarse meshes. Numerical experiments will also be shown in order to support the theoretical results.

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