Stable Hybridization Techniques in Computational Mechanics

Modern discretization schemes, based on domain decomposition methods or hierarchical modelling, are among the most powerful methods for the solution of large scale and heterogeneous problems in continuum mechanics. Very often these techniques can be analyzed within an abstract framework. Basic ingredients for the analysis are trace results, a primal-dual pairing, uniform inf-sup conditions and stabilization terms. In this talk, we provide some examples for finite element schemes on non-matching meshes and address stability issues.
Of crucial importance for the asymptotic optimality is the transfer and the interfaces which has to reflect the coupling between essential and natural boundary conditions. Numerical examples illustrate the flexibilty and performance of the hybrid approach and the robustness of the iterative solver.
Applications to porous media and elasto-acoustics are presented.