

Seminario de Análisis Numérico y Modelamiento Matemático de Estudiantes

A discontinuous Galerkin method for dissimilar meshes.

In many different applications, interfaces divide the domain of interest $\Omega \subset \mathbb{R}^d$, where $d = 2, 3$, into several subdomains where the governing equations and/or boundary conditions are different. In this context, it is not uncommon to mesh the subdomains separately using different meshsizes. In this talk, we present a Hybridizable Discontinuous Galerkin (HDG) method for the problem posed by the coupling of the Stokes and Darcy equations, whose domains are discretized by two independent subdomains with different meshes that do not necessarily coincide. To properly couple the two different discretizations, the proposed transmission conditions are based on mass conservation, the equilibrium of normal forces, and the Beavers-Joseph-Saffman law. Furthermore, we establish the well-posedness of the problem and error estimates to demonstrate the stability of the HDG method. Finally, we demonstrate the capabilities of the method by presenting numerical experiments that validate our theory.

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