UNIVERSIDAD CATOLICA
DE LA SANTISIMA CONCEPCION

SEMINARIO DEL DEPARTAMENTO DE MATEMÁTICA Y FÍSICA APLICADAS

FACULTAD DE INGENIERÍA

"Conforming mixed finite element methods for the coupling of fluid flow with porous media flow"

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Facultad de Comunicación, Historia y Ciencias Sociales - UCSC

Abstract:

In this talk we review recent advances in numerical methods for the coupling of fluid flow with porous media flow. Flows are governed by the Stokes and Darcy equations, respectively, and the corresponding transmission conditions are given by mass conservation, balance of normal forces, and the Beavers-Joseph-Saffman law. We consider the usual primal formulation in the Stokes domain and the dual-mixed one in the Darcy region and show that, using any pair of stable Stokes and Darcy elements, the corresponding Stokes-Darcy Galerkin scheme becomes well posed. We extend this previous results to the Navier-Stokes/Darcy coupled problem. Finally, we provide several numerical results illustrating the good performance of the Galerkin methods for different geometries of the problem.

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