

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

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Coupling Free Flow with Porous Media Flow

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Abstract.

Coupling free flow with porous media flow has many applications in geo-sciences and engineering. We consider a model for the coupled Navier-Stokes and Darcy equations. The Navier-Stokes equations are used to model flow in a free fluid flow domain and Darcy's law for the flow in a porous media domain. We will show the existence and uniqueness of a weak solution for the coupled problem. We will propose a numerical method that uses continuous finite elements in the incompressible flow region and discontinuous finite elements in the porous media domain. Numerical results to illustrate the nature of the flows generated and to verify theoretical convergence rates will also be presented.