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## PIMS / AMI Seminar Series

Tuesday, November 30, 2010  
3:30 p.m.  
CAB 657

### “Well-posed Stokes/Brinkman and Stokes/Darcy problems for coupled fluid-porous viscous flows”

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#### Abstract

We present a well-posed model for the Stokes/Brinkman problem with a family of *jump embedded boundary conditions (J.E.B.C.)* on an immersed interface with weak regularity assumptions. It is issued from a general framework recently proposed for fictitious domain problems. Our model is based on algebraic transmission conditions combining the stress and velocity jumps on the interface  $S$  separating the fluid and porous domains. These conditions, well chosen to get the coercivity of the operator, are sufficiently general to get the usual immersed boundary conditions on  $S$  when fictitious domain methods are concerned: Stefan-like, Robin (Fourier), Neumann or Dirichlet... Moreover, the general framework allows to prove the global solvability of some models with physically relevant stress or velocity jump boundary conditions for the momentum transport at a fluid-porous interface. The Stokes/Brinkman problem with *Ochoa-Tapia & Whitaker (1995)* interface conditions and the Stokes/Darcy problem with *Beavers & Joseph (1967)* conditions are both proved to be well-posed by an asymptotic analysis. Up to our knowledge, only the Stokes/Darcy problem with *Saffman (1971)* approximate interface conditions was known to be well-posed.

Refreshments will be served in CAB 649 at 3:00 p.m.