

Texas Tech University. Applied Mathematics Seminar.

## **FORCHHEIMER EQUATIONS IN POROUS MEDIA**

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Wednesday, March 25, 2009

Room: MA 111, Time: 4:00pm

ABSTRACT. Darcy's law describes the linear relation between the velocity and gradient of pressure of the fluid. We consider a general non-linear relationship between them. This covers many models suggested by Forchheimer and investigated by engineers. For slightly compressible fluids, using this relation, we derive for the pressure a degenerate non-linear parabolic equation with the implicit coefficient function. Either non-autonomous Dirichlet or the time-dependent total flux boundary condition is imposed on a portion of the boundary. We establish the monotonicity which guarantees the uniqueness of classical solutions. Other a priori estimates, well-posedness, stability and long time dynamics will also be studied.

This is a joint work with Eugenio Aulisa, Lidia Bloshanskaya and Akif Ibragimov.