

Texas Tech University. Applied Mathematics Seminar.

FORCHHEIMER EQUATIONS IN POROUS MEDIA: PART II

Luan Hoang, Texas Tech University

Wednesday, September 9, 2009

Room: MA 016, Time: 4:00pm

ABSTRACT. This presentation focuses on the stability of non-linear flows of slightly compressible fluids in porous media not adequately described by Darcy's law. We study a class of generalized nonlinear momentum equations which covers three well-known Forchheimer equations, the so-called two-term, power, and three-term laws. The generalized Forchheimer equation is inverted to a non-linear Darcy equation with implicit permeability tensor depending on the pressure gradient. This results in a degenerate parabolic equation for the pressure. Two classes of boundary conditions are considered, given pressure and given total flux. The uniqueness, Lyapunov and asymptotic stability of the solutions, and their continuous dependence on the boundary data are analyzed.

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