Texas Tech University - Department of Mathematics and Statistics

Seminar in Applied Mathematics

Global Estimates for Generalized Forchheimer Flows of Slightly Compressible Fluids

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ABSTRACT. We study generalized Forchheimer flows of slightly compressible fluids in porous media. They are reformulated as a degenerate parabolic equation for the pressure. The initial boundary value problem is studied with time-dependent Dirichlet boundary data. The estimates up to the boundary and for all time are derived for the L^∞-norm of the pressure, its gradient and time derivative. Large-time estimates are established to be independent of the initial data. Particularly, thanks to the special structure of the pressure's nonlinear equation, the global gradient estimates are obtained in a relatively simple way, avoiding complicated calculations and a prior requirement of Hölder estimates. This is joint work with Thinh Kieu (University of North Georgia, Gainesville).