1126-65-80   **Thinh Kieu*** (`thinh.kieu@ung.edu`), 3820 Mundy Mill Rd., Oakwood, GA 30566. *Galerkin finite element method for Generalized Forchheimer Flows of Slightly Compressible Fluids.*

We consider the generalized Forchheimer flows for slightly compressible fluids. Using Muskat's and Ward's general form of Forchheimer equations, we describe the fluid dynamics by a nonlinear degenerate parabolic equation for the density. We study Galerkin finite elements method for the initial boundary value problem. The existence and uniqueness of the approximation are proved. The prior estimates for the solutions and its gradient are established. Then the error estimates for the density variable are derived in several norms for both continuous and discrete time procedures. Numerical experiments using backward Euler scheme agreed with the theoretical analysis regarding convergence rates. (Received January 03, 2017)