Mixed Finite Element Methods for Slightly Compressible Miscible Problems Arising in the Enhanced Oil Recovery in Reservoir Studies

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In this talk, I shall discuss finite element methods for two strongly coupled parabolic pdes (one in pressure and the other in concentration), which arises in the mathematical model describing two component single phase miscible displacement of one compressible fluid by another in a porous medium. A mixed finite element method is applied to approximate the pressure equation and standard Galerkin method is employed for the approximation of the concentration equation. Error estimates are derived when the diffusion-dispersion coefficient is allowed to depend on the arcy velocity.