

1033-35-75

David M. Ambrose* (dambros@clermson.edu), Dept. of Mathematical Sciences, Martin Hall,
Clemson, SC 29634. *Well-Posedness and Stability Conditions for Some Darcy Flows.*

Darcy's law can describe the motion of a fluid in a variety of contexts, such as in a Hele-Shaw cell or in a porous medium. The fluid velocity is proportional to the pressure gradient in these flows. In this talk, I will describe my proofs of well-posedness for some two-phase Darcy flows without surface tension, in 2D or 3D. Here, the initial value problem is well-posed if a condition is satisfied by the initial data; this condition, in the density-matched case, says that the more viscous fluid must displace the less viscous fluid. If possible, at the end I will discuss similar results for some rotational Hele-Shaw flows (the rotational work is joint with Steve Shkoller). (Received September 03, 2007)