



Lifting Hele-Shaw cell with grooves as a model for unstable two-phase flow on rough surfaces

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Viscous fingering in the Hele-Shaw cell is a well studied problem to model flow in porous media. We study the fingering patterns in a lifting Hele-Shaw cell, where grooves of different geometry are etched on to the lower plate. The patterns are video photographed through the transparent plates, and differences on changing experimental conditions are noted. We also develop a simple computer algorithm to mimic the viscous fingering on grooved plates. Salient features of the fingering process are reproduced. We suggest that this problem may serve as a paradigm for flow of fluids in porous and fractured rocks.