THE UNIVERSITY   **OF HONG KONG**

Department of Mathematics

C O L L O Q U I U M

On the Muskat problem with viscosity jump: global in time results

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Abstract

This talk is about the Muskat problem, modeling the filtration of two incompressible immiscible fluids in porous media. We consider the case in which the fluids have different constant densities together with different constant viscosities. In this situation the equations are non-local, not only in the evolution system, but also in the implicit relation between the amplitude of the vorticity and the free interface. Among other extra difficulties, no maximum principles are available for the amplitude and the slopes of the interface in L^∞. We prove global in time existence results for medium size initial stable data in critical spaces. We also improved previous methods showing smoothing (instant analyticity) together with sharp decay rates of analytic norms for a more general class of initial data. The found technique is twofold, giving ill-posedness in unstable situations for lower regularity solutions. This is joint work with Gancedo, Garcia-Juarez, and Patel. I will also discuss recent related joint work with Jian-Guo Liu on a model of the epitaxial growth process of crystals.

Date:	**July 4, 2018 (Wednesday)**
Time:	**3:00 – 4:00pm**
Venue:	**Room 309, Run Run Shaw Bldg., HKU**

All are welcome