The Institute of Mathematical Sciences   數學科學研究所
Department of Mathematics   數學系
The Chinese University of Hong Kong   香港中文大學

Joint Colloquium

The Rayleigh-Taylor Condition for the Muskat Problem

Abstract: Of concern is the moving boundary problem of a two-phase potential flow of two fluids with possible different densities and viscosities. Such problems are known as Muskat problems or two-phase Hele-Shaw flows. Due to the moving interfaces these problems are intrinsically nonlocal and highly nonlinear. A criterion is presented, known as the generalised Rayleigh-Taylor condition, which guarantees that for large classes of initial data these problems are classically well-posed, possibly on a finite time interval only. Away from the Rayleigh-Taylor regime the system becomes unstable and finger-shaped unstable steady states can occur. A thin film approximation is also discussed. Here the dynamical behaviour is different: global weak solutions exist for any square integrable non-negative initial configuration. In addition, the flat steady state is globally stable in the class of weak solutions.

By

Prof. Dr. Joachim ESCHER

Leibniz University Hannover

Date   :   **May 10, 2019 (Friday)**

Time   :   **4:00pm – 5:00pm**

Venue :   **Room 501a, Academic Building No. 1, CUHK**

All are Welcome