

Special
PHYSICAL MATHEMATICS SEMINAR

**MOVING-BOUNDARY PROBLEMS AND
FREE-SURFACE FLOWS USING
HIGH-ORDER NUMERICAL METHODS**

ROLAND BOUFFANAIS

Ecole Polytechnique Fédérale de Lausanne (EPFL)

ABSTRACT:

Numerous physical phenomena occur within boundaries that move, deform or evolve with time. Examples include the deformation of drops, bubbles, liquid free surfaces, phase boundaries in solidification and vaporization, fluid-structure interaction problems, to name a few. To solve these intrinsically non-linear problems specific mathematical modeling and advanced numerical tools are required.

We will first discuss the weak formulation of unsteady moving-boundary problems with particular emphasis on incompressible viscous free-surface flows. Then we will describe an implementation using an arbitrary Lagrangian-Eulerian kinematics with a high-order numerical method. Subsequently numerical solutions of the non-linear coupling of viscous three-dimensional standing waves will be analyzed.

WEDNESDAY, NOVEMBER 15, 2006

2:30 PM

Building 4, Room 270

*Refreshments at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)*



Massachusetts Institute of Technology
Department of Mathematics
Cambridge, MA 02139