PHYSICAL MATHEMATICS SEMINAR

Two-layer shallow-water internal waves: stability and shocks in mixed type PDEs

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ABSTRACT:

We study the problem of long waves at the interface of two fluid layers of different densities and present three main results: (i) In the weak stratification (Boussinesq) case, the equations of mixed-type are well posed for times up to breaking if the initial data is in the hyperbolic region of phase space. The physical interpretation of this result is that a type of nonlinear stability holds for sufficiently large Richardson number (ii) In the general case there may be initially hyperbolic data that exit into the elliptic region (i.e. the fluid undergoes spontaneous shear instabilities.) (iii) Assuming waves break, we propose a simple choice of conservation laws that allow for mixing between the two fluids. We apply this reformulation to the lock exchange problem.

TUESDAY, NOVEMBER 17, 2015
2:30 PM
Building E18, Room 466A

Reception following in Building E17, Room 401A
(Math Dept. Common Room)

http://math.mit.edu/pms/

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