

PHYSICAL MATHEMATICS SEMINAR

IMPROVED BOUSSINESQ MODELS FOR SOLITARY WAVES

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ABSTRACT:

Recently we formulated a weakly nonlinear, weakly dispersive terrain-following Boussinesq system (SIAP 2003) in order to study solitary waves over highly variable (random) topographies. The modeling allows for multiply-valued topography profiles. The resulting PDE system has highly oscillatory coefficients. In this talk we will present an overview of recent results regarding asymptotics at the level of the EQUATIONS (i.e. modeling issues) as well as asymptotics at the level of the wave SOLUTIONS (illustrated through numerical experiments). Regarding the PDE asymptotics we show how this terrain-following model can be generalized into a one-parameter family of Boussinesq-type systems with improved properties, but of distinct nature. We have also generalized the model into a fully dispersive Boussinesq system (Phys.Rev.Lett. 2004). Regarding the solution asymptotics our theory characterizes the eddy viscosity due to the stochastic forcing from the topography, as well as explores time-reversed refocusing properties with application (for example) to tsunami waveform inversion.

TUESDAY, NOVEMBER 15, 2005

2:30 PM

Building 3, Room 370

Refreshments at 3:30 PM outside of Room 370.



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