

*PDE, Complex Analysis
and Differential Geometry*



Speaker: Dionyssios Mantzavinos
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Thursday, January 15, 2015

9:00 am

Room: 258 Hurley Hall

Title: The "Good" Boussinesq Equation on the Half-Line

Abstract:

The initial-boundary value problem for the "good" Boussinesq (GB) equation on the half-line with data in Sobolev spaces is analysed via Fokas' unified transform method and a contraction mapping approach. First, the basic space and time estimates for the linear GB initial value problem are derived and then the corresponding estimates for the initial-boundary value problem with zero initial data are obtained. Using these estimates, the Fokas solution formula for the linear GB on the half-line is shown to belong to appropriate Sobolev spaces. Finally, well-posedness of the nonlinear initial-boundary value problem is established by showing that the mapping defined by Fokas' formula for GB, when the forcing is replaced with the Boussinesq nonlinearity, is a contraction mapping on a ball of the space $C([0, T^*]; H_x^s(0, \infty))$, $s > 1/2$, where the lifespan T^* depends on the size of the initial and boundary data. In addition, this work extends the validity of the solution formulas obtained by the unified method for the linear GB initial-boundary value problem to a broader Sobolev setting.