The “good” Boussinesq equation on the half-line with Robin boundary conditions

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The ``good'' Boussinesq equation is a classical dispersive partial differential equation that arises in the modelling of nonlinear water waves. In this talk, we consider this nonlinear model on the half-line equipped with Robin boundary conditions. Our objective is to establish local well-posedness of the corresponding initial-boundary value problem in the sense of Hadamard, i.e., to demonstrate existence, uniqueness, and continuous dependence on the initial data.

We begin by deriving an explicit solution representation for the linearized problem by means of the unified transform (also known as the Fokas method) and then use this formula to establish rigorous estimates of Sobolev as well as Strichartz type for data belonging to suitable Sobolev spaces. These estimates are key to proving our local Hadamard well-posedness result through a contraction mapping argument.