

Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 23/24

February 6th, 2024, 11:30 - 12:30
Seminar room: SR 3.061

On the Ill-posedness of the Stably Stratified Boussinesq Equations in the Class of Bounded Initial Data

Lars Eric Hientzsch, Bielefeld University

Abstract

The Boussinesq equations describe the evolution of a stratified fluid under the influence of gravity. We investigate the system in vorticity form in the setting of a continuous background stratification increasing with depth (spectrally stable density profile). We prove that the system is strongly ill-posed in the class of initial data of bounded vorticity and density gradient. The mechanism that allows us to exhibit the norm-inflation in infinitesimal time is purely nonlinear - in contrast to previous results on mild ill-posedness. Time permitting, applications to the 3D axisymmetric Euler equations with small bounded initial vorticity are discussed. The respective ill-posedness result is based on the norm inflation of the swirl. Based on joint work with R. Bianchini (CNR, IAC Rome) and F. Iandoli (Università della Calabria).