

Title: Convergence on the finite-depth fluid equation in the shallow water surface and infinitely deep water limits

Abstract: The finite-depth fluid equation (FDF) is a mathematical model that is of physical interest and characterizes the wave propagation in the fluid of two layers systems. In particular, its dispersion phenomenon varies along with the depth parameters, and at the equation level, it is known to converge to the Korteweg-de Vries equation (KdV) and Benjamin-Ono equation (BO) as the depth parameters go to zero and infinity, respectively.

In this talk, we will discuss this convergence problem first from the deterministic viewpoint. We show that the solutions to the FDF converge to the solutions to the KdV and BO, respectively. Such convergence results give the microscopic properties in the sense that deterministic convergence holds for each given initial data.

Next, we present the probabilistic counterpart. We study (i) the convergence of the Gibbs measures of FDF; (ii) the associated convergence dynamical problem of FDF. Rather than looking at a single solution, we study the dynamics as the statistical ensembles, and hence such convergence properties are explained via the macroscopic limit.

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