FUDAN UNIVERSITY

Applied Math Ph.D. Seminar

On the Constantin–Lax–Majda Model with Convection

Speaker: Xiao Ren (Fudan University)

Time: 2021-03-25, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Zhen Lei (Fudan University)

Abstract: The well-known Constantin–Lax–Majda (CLM) equation, an important toy model of the 3D Euler equations without convection, can develop finite time singularities. De Gregorio modified the CLM model by adding a convective term, which is known important for fluid dynamics. We present two results on the De Gregorio model, based on a joint work with Prof. Z. Lei and J. Liu. The first one is the global well-posedness of such a model for general initial data with non-negative (or non-positive) vorticity. The second one is an exponential stability result of ground states, which is similar to the recent significant work of Jia et al. (Ration Mech Anal, 231:1269–1304, 2019).

The global wellposedness of De Gregorio model with general smooth initial data on the circle remains an interesting conjecture. We hope that well-designed numerical simulations could reveal deeper structures of the equation.