Global well-posedness for the non-homogeneous Euler equations in presence of Ekman pumping

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Abstract

In the study of ocean dynamics many factor have to be taken in considerations. The Coriolis force tends to drive the flow to a purel planar configuration. The action of gravity, which instead tends to stratify the density on the vertical direction. And the so-called Ekman pumping effect which is a mechanism of dissipation of kinetic energy. It originates from a boundary layer close to the oceanic bottom, but involves in fact a global dynamics, affecting also the mean flow in the bulk.

The Ekman pumping term takes the form of a linear damping term

$$\mathcal{D}^{\alpha}_{\gamma}(\rho, u) = \alpha \rho^{\gamma} u, \tag{1}$$

with $\alpha > 0$ and $\gamma \in \{0, 1\}$. In this talk, I will present a recent result concerning the global-wellposedness of the non-homogeneous Euler system with damping term (1) which model the Ekman pumping effect.

Keywords: Global-wellposedness, non-homogeneus Euler, Ekman pumping.

References

[1] M. Bravin, F. Fanelli, *Global existence for non-homogeneous incompressible inviscid fluids in the presence of Ekman pumping*, Communications in Contemporary Mathematics, 2550025, 2025.