The rotating Navier-Stokes-Fourier-Poisson system on thin domains

Matteo Caggio
Institute of Mathematics, Academy of Science of Czech Republic, Prague.
caggio@math.cas.cz

Abstract

We consider the compressible Navier–Stokes–Fourier–Poisson system describing the motion of a viscous heat conducting rotating fluid confined to a straight layer $\Omega_\epsilon = \omega \times (0, \epsilon)$, where ω is a 2-D domain. The aim of this paper is to show that the weak solutions in the 3D domain converge to the strong solution of the 2-D Navier–Stokes–Fourier–Poisson system on ω as $\epsilon \to 0$ on the time interval, where the strong solution exists. We consider two different regimes in dependence on the asymptotic behaviour of the Froude number.

Keywords: Navier-Stokes-Fourier-Poisson system, weak solution, entropy, rotation, accretion disk, thin domains, dimension reduction, strong solution.

References

[1] Bernard Ducomet, Matteo Caggio, Šárka Nečasová, and Milan Pokorný *The rotating Navier-Stokes-Fourier-Poisson system on thin domains*, arXiv:1606.01054v1.