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Stability of stratified density under incompressible flows

Friday, 16 January 2026 09:00 (1 hour)

In this talk, I will discuss asymptotic stability in the incompressible porous media equation in a periodic channel. It is well known that a stratified density, which strictly decreases in the vertical direction, is asymptotically stable under sufficiently small, smooth perturbations. We achieve optimality in the regularity assumptions on the perturbation and in the convergence rate. We apply a similar idea to the Stokes transport system. Instead of relying on the linearized equations, we directly address the nonlinear problem, and the decay of solutions will be obtained from the gradient flow structure of the equation.

Presenter: PARK, Jaemin (Yonsei University)