THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PDE

Rigidity of Steady Solutions to the Navier-Stokes Equations in High Dimensions and its applications

Prof. Jeaheang Bang

The University of Texas at San Antonio

Abstract

Solutions with scaling-invariant bounds, such as self-similar solutions, play an important role in the understanding of the regularity and asymptotic structures of solutions to the Navier-Stokes equations. We proved that any steady solution satisfying $|u(x)| \leq C/|x|$ for any constant C in $R^n \backslash \{0\}$ with $n \geq 4$, must be zero without imposing a smallness or self-similarity assumption. Our main idea is to analyze the velocity field and the total head pressure via weighted energy estimates with suitable multipliers, and our proof is elementary and short. These results not only give the Liouville-type theorem for steady solutions in higher dimensions but also help to remove a class of singularities of solutions and give the optimal asymptotic behaviors of solutions at infinity in the exterior domains. This is a joint work with Changfeng Gui, Hao Liu, Yun Wang and Chunjing Xie.

Date: 10 November 2023 (Friday)

Time: 9:30am

Zoom Meeting: **https://hkust.zoom.us/j/95202069493** **(Passcode: 305143)**

All are Welcome!