



For Favour of posting

The Hong Kong University of Science and Technology

Department of Mathematics

Seminar on Pure Mathematics

On 2d incompressible Euler equations with partial damping & some related model problems

by

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Abstract

The statistical approach led R. H. Kraichnan to conjecture the existence of energy and enstrophy transfers between different Fourier modes in 2d Navier-Stokes turbulence [Phys. Fluids 10 (1967), no. 7, 1417–1423]. The present work is motivated by an interesting question: what if some of the Fourier modes are removed or added? In the first part of this talk, we illustrate that damping of spatial frequencies of Fourier modes can have an effect on properties of the solutions, hence in turn on the transfer process of 2d turbulence, as the modes are associated with vorticity gradients generated at small scales in the turbulence. This part is based on joint work with Vladimir Sverak and Tarek Elgindi.

In the second part of this talk, we introduce a finite-dimensional model conservative system subject to dissipation and Gaussian-type stochastic perturbations. The original conservative system possesses a continuous set of steady states, and is thus degenerate. We characterize the long-time limit of our model system as the perturbation parameter tends to zero. Our model problem is used to illustrate some geometric features related to 2-dimensional Euler equations with partial damping. This part is based on a recent work of the speaker.

Date: Tuesday, 2 July 2019

Time: 11:00a.m. - 12:00noon

**Venue: Room 3472, Academic Building
(near Lifts 25-26), HKUST**

All are welcome!