The Hong Kong University of Science and Technology

Department of Mathematics

Seminar on Applied Mathematics

One-dimensional Hydrodynamic Model for Turbulence with Cascade and Singular Solutions
by

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Abstract
One way to tackle the problem of fluid turbulence is to study its model with drastically reduced degrees of freedom. These models are made in mostly phenomenological ways to have a few selected qualitative aspects of turbulence. As a minimal mathematical model, we propose a one-dimensional partial differential equation that conserves the L^p norm ($p \geq 1$) of the vorticity in the inviscid case. With a large-scale random forcing and small viscosity, we find numerically that the model exhibits the cascade of the inviscid invariant, the broad energy spectrum with a correction to the dimensional-analysis prediction connected to singular steady solutions and self-similarity in the dynamical system structure.

Date: *Friday, 25 Aug 2017*

Time: *3:00p.m. – 4:00p.m.*

Venue: *Room 5506, Academic Building (near Lifts 25 & 26), HKUST*

All are welcome!

Wine-Cheese-tea gathering at 4:00pm, 3/F Magic Square