The Hong Kong University of Science and Technology

Department of Mathematics

Departmental Colloquium

Recent Progress in Searching for Finite Time Singularities of 3D Euler Equations and Related Models

by

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Abstract

Whether the 3D incompressible Euler equations can develop a singularity in finite time from smooth initial data is one of the most challenging problems in mathematical fluid dynamics. This question is closely related to the Clay Millennium Problem on 3D Navier-Stokes Equations. A potential singularity in the 3D Euler equations is significant because it may be responsible for the onset of energy cascade in turbulent flows. We first review some recent theoretical and computational studies of the 3D Euler equations. Our study suggests that the convection term could have a nonlinear stabilizing effect for certain flow geometry. Recent computations have provided strong numerical evidence that the 3D Euler equations develop a finite time singularity from smooth initial data. I will report some recent progress in providing a rigorous justification of the singularity formation in the 3D Euler equations and related models.

Date:　　　　*Wednesday, 24 October 2018*
Time:　　　　*3:00p.m. - 4:00p.m.*
Venue:　　　 *Lecture Theatre E, HKUST*

All are welcome!