Department of Applied and Computational Mathematics and Statistics Colloquium

Bjorn Birnir

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will give a lecture entitled:

The Invariant Measure of the Stochastic Navier-Stokes Equation

Abstract

The mathematical proof of Kolmogorov's (1962) statistical theory of turbulence consists of proving the existence of the invariant measure of the Navier-Stokes equation, on which the statistical theory is based. In this talk, we discuss how the laminar solution of the Navier-Stokes equation becomes unstable for large Reynolds number and the stable solution is the solution of the stochastic Navier-Stokes equation. This is the unique solution that describes fully-developed turbulence. In order to compare with experiments and simulations, we solve the stochastic Hopf's equation for the invariant measure. The Feynmann-Kac formula produces log-Poisson processes from the stochastic Navier-Stokes equation. These processes, first found by She, Levenque, Waymire, and Dubrulle, five the intermittency corrections to the structure functions of turbulence. The probability density function of the two-point statistics that can be compared to experiments and simulations turn out to be similar to the generalized byperbolic distributions first suggested by Barndorff-Nielsen.

Tuesday, November 29th, 2011
4:00 p.m. to 5:00 p.m.
127 Hayes-Healy Center