Temple University Mathematics Colloquium

Jonathan Mattingly

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will speak on

Stabilization and selection by noise

ABSTRACT:
   I will discuss a number of examples where the addition of noise leads to a qualitative change in the dynamics of the system. My main emphasis will be on a simple planar ODE which has solutions which explode in finite time. Yet when noise is added the system is stabilized and develops a number of interesting "out of equilibrium" behaviors. This is an instructive example of "stablization by noise" and could be an instructive example for considering more complicated settings such as PDEs which people hope are stabilized by noise. In this simple example, the interaction of the noise and the instability leads to a system which at once equilibrates quickly but also has heavy tails and "intermittent" behavior. I will provide a general framework to think about such problems.
If time permits I will also talk about a simple example which deterministically possesses many invariant measures, yet the zero noise limit of the stochastically forced system limit possesses only one invariant measure. This leads to some serious mathematical challenges including a limiting problem which does not have a unique solution. Uniqueness is only obtained when it is viewed as the limit of a noisy system.

Monday, October 13
Lecture at 4:00 pm
Coffee, tea, and refreshments from 3:40 pm
Room 617, Wachman Hall
Department of Mathematics