

Analysis Seminar Thursday October 17, 2013

12:30-1:20pm SCEN 322

Speaker: Nate Eldredge, University of Northern Colorado

Title: Widder's representation theorem for Dirichlet forms

Abstract: The classical heat equation on \mathbb{R}^d is perhaps the simplest possible parabolic PDE, but it has an annoying feature: solutions are not uniquely determined by their initial values. Widder showed in 1944 that this annoyance can be circumvented by considering only nonnegative solutions, a restriction that is completely reasonable for physical applications such as heat flow (temperatures can't go below absolute zero). I'll discuss an extension of this result to the setting of Dirichlet forms, which in some sense generalize the Laplace operator in a way that preserves the connections between the heat equation and Brownian motion. I'll give a brief introduction to Dirichlet forms, which involve an appealing combination of ideas from functional analysis, probability theory, and PDE, and I'll describe some motivating examples (including the sub-Riemannian manifolds of my colloquium talk!). This is joint work with Laurent Saloff-Coste.