Analysis Seminar

Thursday, October 23, 2014

4:30-5:20 pm in Hume 331

Optimizing a variable-rate diffusion to hit an infinitesimal target at a set time

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I consider a stochastic optimization problem for a time-changed Brownian motion whose diffusion rate is constrained to be between two positive values $r_1 < r_2$. The problem is to find an optimal adapted strategy for the choice of diffusion rate in order to maximize the chance of hitting an infinitesimal region around the origin at a set time in the future. More precisely, the parameter associated with "the chance of hitting the origin" is the exponent for a singularity induced at the origin of the final time probability density. I show that the optimal exponent solves a transcendental equation depending on the ratio of r_2 to r_1. Without going into technical details, some ideas behind this technique will be illustrated in the case of a model of squared Bessel nonintersecting paths.