Statistics Seminar

Department of Mathematical Sciences

DATE:	Thursday, May 05, 2016
TIME:	1:15pm to 2:15pm
LOCATION:	WH 100E
SPEAKER:	Aleksey Polunchenko, Binghamton University
TITLE:	On a Diffusion Process that Arises in Quickest Change-Point Detection

Abstract

We consider the diffusion $(R_t)_{t\ge0}$ generated by the stochastic differential equation $dR_t=dt+\mu R_t dB_t$ with $R_0=0$, where $\mu\neq0$ is given and $(B_t)_{t\ge0}$ is standard Brownian motion. We obtain a closed-from expression for the quasi-stationary distribution of $(R_t)_{t\ge0}$, i.e., the limit $Q_A(x)=\lim_{t\to+\infty}\Pr(R_t\le x|T_A>t)$, $x\in[0,A]$, where $T_A=\inf\{t>0:R_t=A\}$ with $A>0$ fixed. The process $(R_t)_{t\ge0}$, its quasi-stationary distribution $Q_A(x)$, $x\in[0,A]$, and the stopping time T_A are of importance in the theory of quickest change-point detection, especially the case when A is large. We study the asymptotic behavior of $Q_A(x)$ for large A's, and provide an order-three asymptotic approximation.