

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 $(R_t)_{t \geq 0}$ generated by the stochastic differential equation $dR_t = dt + \mu R_t dB_t$ with $R_0 = 0$, where $\mu \neq 0$ is given and $(B_t)_{t \geq 0}$ is standard Brownian motion. We obtain a closed-form expression for the quasi-stationary distribution of $(R_t)_{t \geq 0}$, i.e., the limit $Q_A(x) = \lim_{t \rightarrow \infty} \Pr(R_t \leq x | T_A > t)$, $x \in [0, A]$, where $T_A = \inf\{t > 0: R_t = A\}$ with $A > 0$ fixed. The process $(R_t)_{t \geq 0}$, 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.

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