Statistics Seminar

Department of Mathematics and Statistics

DATE:	Thursday, Dec 7, 2023
TIME:	1:15pm – 2:15pm
LOCATION:	WH 100E
SPEAKER:	Zhongyuan Zhao, Binghamton University
TITLE:	On Quasi-stationarity of the Shiryaev Recurrence in an Exponential Case

Abstract

We consider the classical Shiryaev recurrence $\{R_n\}_{n\ge0}$ with $R_0=0$ driven by log-exponential data such that $\{R_n-n\}_{n\ge0}$ is a zero-mean martingale. The recurrence, restricted to the interval $[0,A]$, with $A>0$ being a preset absorbing boundary, is known to exhibit quasi-stationarity (time-invariant probabilistic behavior, conditional on no extinction hitherto) in the limit as $n\to+\infty$ for any fixed $A>0$. The quasi-stationary distribution and its characteristics (e.g., moments) are of importance in quickest change-point detection. We obtain a closed-form formula for the k-th moment (k is a natural number) of the quasi-stationary distribution. We then use the moment formulae to obtain bounds for the limiting killing rate of the Shiryaev recurrence. We conclude with remarks on how the bounds can be used in quickest change-point detection.