

Statistics Seminar  
Department of Mathematics and Statistics

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

**Abstract**

We consider the classical Shiryayev recurrence  $\{R_n\}_{n \geq 0}$  with  $R_0 = 0$  driven by log-exponential data such that  $\{R_{n-n}\}_{n \geq 0}$  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  $n \rightarrow +\infty$  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 Shiryayev recurrence. We conclude with remarks on how the bounds can be used in quickest change-point detection.

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