

Statistics Seminar
Department of Mathematical Sciences

DATE:	Thursday, October 23, 2014
TIME:	1:15pm to 2:15pm
PLACE:	OW 100E
SPEAKER:	Wenyu Du (Binghamton University)
TITLE:	On Robustness of the Shiryaev-Roberts Change-Point Detection Procedure under Parameter Misspecification in the Post-Change Distribution

Abstract

The gist of the quickest change-point detection problem is to detect the presence of a change in the statistical behavior of a series of sequentially made observations, and do so in an optimal way. When optimality is understood either in the generalized Bayesian sense or as defined in Shiryaev's multi-cyclic setup, the so-called Shiryaev-Roberts (SR) detection procedure has been shown to be the "best one can do", provided, however, that both the pre- and post-change distributions of the observations are fully specified. As the latter condition is practically restrictive, we consider a more realistic setup, viz. one where the post-change distribution is assumed known only up to a parameter, so that the "anticipated" value of the parameter need not match the true (unknown) one. The question of interest is the sensitivity (or robustness) of the otherwise "best" SR procedure with respect to a possible misspecification of the post-change parameter. To answer this question, we develop a numerical framework to compute the performance of the SR procedure that may be "out of tune" in the way of the post-change parameter. We then employ the proposed framework in a specific Gaussian scenario and quantify the effect that a misspecification of the post-change parameter has on the SR procedure's performance. The overall qualitative conclusion is that the less (more) contrast the change, the less (more) robust the SR procedure devised to detect it.

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