

**Department of Industrial, Manufacturing
and Systems Engineering**



Department of Mathematical Sciences

Applied Artificial Intelligence Community of Practice



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📍 Bell Hall 130 ⌚ 3pm

Univariate Fast Initial Response Statistical Process Control with Taut Strings

Abstract

We present a novel real-time univariate monitoring scheme for detecting a sustained departure of a process mean from some given standard assuming a constant variance. Our proposed stopping rule is based on the total variation of a nonparametric taut string estimator of the process mean and is designed to provide a desired average run length for an in-control situation. Compared to the more prominent CUSUM fast initial response (FIR) methodology and allowing for a restart following a false alarm, the proposed two-sided taut string (TS) scheme produces a significant reduction in average run length for a wide range of changes in the mean that occur at or immediately after process monitoring begins. A decision rule for when to choose our proposed TS chart compared to the CUSUM FIR chart that takes into account both false alarm rate and average run length to detect a shift in the mean is proposed and implemented. Supplementary materials are available online. This is joint work with Michael Pokojovy (UTEP).

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