

Optimal Design of Cumulative Sum Control Charts Under Shift Uncertainty

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This paper considers efficient design of the cumulative sum (CUSUM) control chart for detecting process mean shifts with unknown magnitude. A fast and accurate algorithm based on the gradient method is developed for this purpose. Optimal design parameters are obtained and compared with the one obtained through simulations in literature. The gradient-based method is shown to provide more accurate and faster design of the CUSUM chart under uncertainty than using Monte Carlo simulations.

Keywords: Average Run Length; Simulation; Statistical Process Control.