

Detecting mean increases in zero truncated INAR(1) processes

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Abstract: Count data with zero truncation are common in the production process. It's essential to monitor these data during production flow, production quality control and market management. Most of the previous studies were based on the independent observations assumption. In fact, serial dependence of count data which significantly affects the performance of the control charts exists extensively in practice. Motivated by this, several important first-order integer-valued autoregressive time series processes are used to model the autocorrelated count data with zero truncation. We investigate the effectiveness of three following charts, the combined jumps chart, the exponentially weighted moving average chart and the cumulative sum chart, to detect the upward shifts of the process mean based on these models. A bivariate Markov chain approach could be used to obtain the average run length of these charts. Design recommendations for achieving robustness are provided based on the computation study. An application to product quality complaints data is presented to demonstrate good performances of the charts.