ON THE PERFORMANCE OF ALTERNATIVE ADAPTIVE CONTROL CHARTS

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Abstract

In an attempt to improve the procedures for statistical process control many researchers have developed and proposed a variety of adaptive control charts in the last decade. The common characteristic of those charts is that e or more of the chart parameters (sampling interval, sample size, control limits) is allowed to change during operation taking into account current sample information. Due to their flexibility, adaptive charts are more effective than their static counterparts but they are also more complex in terms of implementation. The purpose of our research is to evaluate the economic performance of various adaptive control schemes so as to derive conclusions about their relative effectiveness. The analysis concentrates on Bayesian control charts used for monitoring the process mean in finite production runs. We present dynamic programming formulations and properties of the optimal solutions, which we then use to solve a number of numerical examples. The results from our comparative numerical study indicate that the chart parameter having the most positive impact on the economic performance by being adaptive is the sampling interval. It is therefore sufficient, in most cases, to use control charts with adaptive sampling intervals rather than other types of partially adaptive charts or the more complicated fully adaptive control charts.

Key words: *Statistical Process Control, Adaptive Control Charts, Economic Design*