PIMS Distinguished Lecture Series

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A New Approach for Monitoring Process Variance

Control charts are effective tools for signal detection in both manufacturing processes and service processes. Much of the data in service industries comes from processes having non-normal or unknown distributions. The commonly used Shewhart variable control charts, which depend heavily on the normality assumption, are not appropriately used here. We propose a new variance control chart based on a simple statistic to monitor process dispersion shifts for a distribution-free quality variable. We explore the sampling properties of the new monitoring statistic and calculate the average run lengths of the proposed variance chart. The out-of-control dispersion detection performance of the proposed variance control chart and those of the existing dispersion control charts are compared. Comparison results show that the proposed variance control chart always outperforms the existing control charts. We hence recommend employing the new variance control chart. Finally, a numerical example of a service system for a bank branch in Taiwan is used to illustrate the application of the proposed control charts.

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