COMPARATIVE STUDY OF THECUSUM AND EWMA CONTROL CHARTS PERFORMANCE IN DETECTING CHANGES IN THE PROCESS AVERAGE

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Abstract :
Control charts are used to control the process statistically and as the instruments that considered which the process is in control statistically or not. Shewhart control charts use only the information enclosed in the last plotted point and they ignore information given by the sequence of all points. This feature makes Shewhart control charts relatively insensitive to small changes in the process, in the order of 1,5σ. Cusum and EWMA control charts are ones of the control charts were recommended as the alternative of Shewhart control charts.

This research presents a comparative study of the Cusum and EWMA control charts performance in detecting small changes in the process average. Starting from the data of a productive process, several series were simulated. Cusum and EWMA control charts were used to determine the average run length (ARL). ARL found by each chart which was then, compared. ARL is expected number of samples are necessary in the process until appearing the first out of control point.

From the study and analyzed, it was observed that the Cusum control chart practically did not detect shift of the mean for the levels of variation less than 1σ. For these
variation levels, the EWMA control charts was more efficient than Cusum control charts. Among the parameters EWMA control charts, $\lambda = 0,10; L = 2,814$ and $\lambda = 0,05; L = 2,615$ were the ones that did a better job since more sensitive in detecting shift of the mean

Keywords: Cumulative sum, Exponentially weighted moving average, Average run length