

# *Designing of $\bar{X}$ control chart with variable sample size and variable sampling interval by using continuous functions*

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## **Abstract**

Statistical process control (SPC) is customary way to promote a product quality in industries. A control chart is the well-known tools in SPC. The Shewhart control chart is used a lot in the production processes but it is weak in detection of small shifts. To improve the power of control charts, adaptive schemes like variable sample size and sampling interval (VSSI) have been extensively developed. In old approaches like VSSI the difference between two points were placed in the same region was not considered. In this study, the position of each point is noticed separately so a new VSSI control chart is proposed with using continuous functions for determining next sample size and sampling interval. In this chart the sample size and sampling interval are not parameter, indeed they are changed to the variables. The comparison study between classical VSSI chart and new VSSI chart is conducted, and the result shows that new VSSI chart's performance characteristics are significantly better than those of classical adaptive charts in all situations, especially, in processes with slight shift and high quality.

**Keywords;** Quality control, Variable sample size, Variable sampling interval, Continuous function.