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ECONOMIC DESIGN OF FRACTION NON-CONFORMING QUALITY CONTROL CHART

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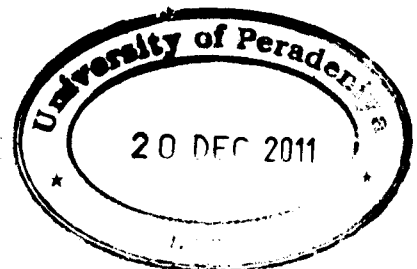
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Control charts are widely used to establish and maintain statistical control of a process. They are also effective devices for estimating process parameters, particularly in process- capability studies. The design of a control chart requires the engineer or analyst to select a sample size, a sampling frequency and the control limits for the chart. Selection of these three parameters is usually called the design of the control charts.

Traditionally, control charts have been designed with respect to statistical criteria only. This usually involves selecting the sample size and control limits for predetermined values of α and β risks. The design of a control chart has economic consequences in that the cost of sampling, cost of testing, cost associated with investigating out-of-control signals, cost of correcting assignable causes and cost of allowing non-confirming units to reach the consumer are all affected by the choice of the control chart parameters. Therefore, it is logical to consider the design of a control chart from an economic viewpoint.

This research proposes an economic model for Fraction Non-confirming Quality Control Chart (p-chart), by presenting an algorithm for determining the most economic control parameters such as sample size, sampling frequency, and the control limits that will yield maximum average net income of the process. Finally, the output of the economic model was presented in a tabular form which provides the quality controller

to choose the desired control chart parameters and maximum income according to α and β risks.