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Quality Engineering ›
Volume 16, 2004 - Issue 4

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A Distribution-Free Shewhart Quality Control Chart Based on Signed-Ranks

Saad T. Bakir Ph.D. ✉

66 Cite this article   ⬈ https://doi.org/10.1081/QEN-120038022

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Abstract

Since their inception by Walter Shewhart in the late 1920s, most control chart developments have been distribution-based procedures in the sense that the process output is assumed to follow a specified probability distribution (normal for continuous measurements and binomial or Poisson for attribute data). Due to Deming's influence and their widespread adoption as one of the seven basic tools of total quality management (TQM), control charts have been applied to processes where data may be markedly ... arametric) statistic ... ed chart is of the Shew ... s. The exact false ... t are comp ... rank statistic ... derlying distribut ... y shift alternati ... nt than the

traditional Shewhart X-bar chart under heavy-tailed distributions (the double exponential and the Cauchy) but is less efficient under light-tailed distributions (the uniform and the normal).

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