Statistical Process Control in a Modern Production Environment

Paper 1 is aimed at practitioners to help them test the assumption that the observations in a sample are independent and identically distributed. An assumption that is essential when using classical Shewhart charts. The test can easily be performed in the control chart setup using the samples gathered here and standard statistical software.

In Paper 2 a new method for process monitoring is introduced. The method uses a statistical model of the quality characteristic and a sliding window of observations to estimate the probability that the next item will not respect the specifications. If the estimated probability exceeds a pre-determined threshold the process will be stopped. The method is flexible, allowing a complexity in modeling that remains invisible to the end user. Furthermore, the method allows to build diagnostic plots based on the parameters estimates that can provide valuable insight into the process. The method is explored numerically and a case study is provided. In Paper 3 the method is explored in a bivariate setting.

Paper 4 is a case study on a problem regarding missing values in an industrial process. The impact of the missing values on the quality measures of the process is assessed. Furthermore, guidelines along with software is provided to handle similar problems.

Testing for Sphericity in Phase I Control Chart Applications

When using (x) over bar - R charts it is a crucial assumption that the observations within samples are independent and have common variance. However, this assumption is almost never checked. We propose to use the samples gathered during the phase I study and the test for distributional sphericity, to check this assumption. We supply a graph of the exact percentage points for the distribution of the test statistics. The test statistics can be computed with standard statistical software. Together with the graph of the exact percentage points, the test can easily be performed during a phase I study. We illustrate the method with examples. Copyright (C) 2009 John Wiley & Sons, Ltd.
Projects:

Proceskapabilitet fra et industrielt perspektiv
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Period: 01/10/2005 → 30/09/2010
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Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Project: PhD