

## 随机截尾数控机床三参数威布尔分布模型

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收稿日期 2007-10-23 修回日期 网络版发布日期 2009-1-15 接受日期

**摘要** 工程实际中对数控机床可靠性试验数据进行分析与评估时, 多不考虑截尾时间, 并多采用二参数威布尔分布, 因而数据分析和参数估计中常带来一定误差。针对这一问题, 本文提出首先采用故障总时间法进行故障数据预处理, 其次假设数据服从二参数威布尔分布并求得相关参数, 最后采用改进的插值法来求出位置参数, 得出三参数威布尔分布模型。并以 6 台某系列数控车床 1 年的 28 个随机截尾故障数据为例给出具体计算过程, 这可以提高数控机床可靠性分析与评价的精确性。

**关键词** [机床](#), [随机截尾](#), [故障总时间法](#), [插值法](#), [三参数威布尔分布](#)

分类号 [TG659](#)

## 3-parameter Weibull distribution for random truncated NC machine tool fault data

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**Abstract** In the engineering practice, the reliability test data of the numerically controlled (NC) machine tool were analyzed and evaluated mostly without consideration of the data truncation time. The data were normally fitted by the 2-parameter Weibull distribution, resulting in large error in the data analysis and the parameter estimation. Aiming at this problem, a total fault time method was used to pretreat the fault data, and the relevant parameters were got assuming that the data follow the 2-parameter Weibull distribution, then a 3-parameter Weibull distribution model was established using the improved interpolation technique to evaluate the position parameter. Taking the random truncated fault data of a certain series of 6 NC machine tools in a year as an example to demonstrate the detailed calculation process. The obtained results can improve the accuracy of the reliability analysis and evaluation on NC machine tools.

**Key words** [machine tool](#), [random truncation](#), [total fault time method](#), [interpolation method](#), [three-parameter Weibull distribution](#)

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