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基于灰关系的制造过程稳定性评估

Evaluation for stability of manufacturing process based on grey relation

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中文关键词: 推进系统 产品质量 制造过程 稳定性 灰关系

英文关键词:propulsion system product quality manufacturing process stability grey relation

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中文摘要:

基于灰色系统理论,通过对制造过程中的两个数据序列进行灰关系分析,实现了制造系统的稳定性评估.根据获取制造过程某属性的两个数据序列,对数据序列进行排序,得到排序数据图.按照排序数据图的分布特征,建立两个数据系列之间的灰关系,通过计算分析灰置信水平的大小,实现对制造过程的稳定性评估.计算机仿真试验和实际案例表明:通过对两个数据序列的灰关系分析,若求得的灰置信水平不小于90%,则说明该制造系统是稳定的;否则是不稳定的.所提出的方法可以很好地检测制造系统的稳定性,准确率最高可以达到100%.

英文摘要:

Based on the grey system theory, the stability evaluation of manufacturing system could be put into effect via grey relation analysis of the two data series in the manufacturing process. According to these two data sequences obtained in the manufacturing process with certain property, the data series could be sorted, so the sorting data figure was achieved. The grey relation between two data series was established by means of the distribution features of sorting data figure. And the stability evaluation of manufacturing process can be realized through calculation and analysis of the grey confidence level. Computer simulation experiment and actual case indicate that through analyzing the grey relation of two data series, if the grey confidence level is not less than 90%, the manufacturing system is stable; otherwise, the manufacturing system is not stable. The method proposed is very good at testing the stability of the manufacturing system, with accuracy up to 100%.

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