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Use of the Taguchi Method and Grey Relational Analysis to Optimize Turning Operations with Multiple Performance Characteristics

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Abstract

This article addresses an approach based on the Taguchi method with grey relational analysis for optimizing turning operations with multiple performance characteristics. A grey relational grade obtained from the grey relational analysis is used to solve the turning operations with multiple performance characteristics. Optimal cutting parameters can then be determined by the Taguchi method using the grey relational grade as the performance index. Tool life, cutting force, and surface roughness are important characteristics in turning. Using these characteristics, the cutting parameters, including cutting speed, feed rate, and depth of cut are optimized in the study. Experimental results have been improved through this approach.

Keywords:

Turning operations | Taguchi method | Grey relational analysis | Optimization

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