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Cutting force and surface roughness analysis using gray based taguchi method for turning operation

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Abstract

Metal cutting is one of the most significant manufacturing process in material removal process and turning is the most commonly used method for metal cutting. This paper presents the multi-response optimization of turning process parameters using Grey based Taguchi method. Experiments are designed and conducted based on Taguchi's L_{27} orthogonal array carried out under dry cutting conditions. The turning parameters are cutting speed, feed rate and depth of cut. The responses are feed force (F_X), tangential force (F_Y) and surface roughness (R_a) were recorded for each experiment. Grey relational analysis is used to optimize the multi-performance characteristics to minimize the feed force, tangential force and surface roughness. The depth of cut was identified as the most influential process parameter in all the three responses such as feed force, tangential force and surface roughness.

Biography

Dr.C. K.Umesh is presently working in the University Visvasvarya College of Engineering as a Associate Professor in the Department of Mechanical Engineering, Bangalore from past 20 years. He has guided 22 M.Tech students and 05 students are working for PhD under his guidance in the area of Machining, Micro-Channel, and Coatings of Metals. He has got 30 research papers in reputed Journals/International Conference. He is a Life member for Mechanism and Machines.