A study of optimization of machining conditions in micro end-milling by using response surface design

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Abstrak

In cases of end-milling removal rate, depth of cut, cutting velocity and feedrate were taken into account as important factors affecting machining quality, tool fracture, tool wear and so on. Generally cutting conditions were determined on the basis of field experiences and many researches about cutting force acquisition by using dynamometer and tool shape design have been actively achieved, however quantitative data of the important influential factors for cutting conditions cannot be actually suggested. In this study axial depth of cut and radial depth of cut were taken into account as design factors among cutting conditions such as spindle RPM, feedrate, axial depth of cut and radial depth of cut by using a 3-axis micro machining system. Choosing width of machining errors as a criterion for machining quality, an approximate model was established by using "Response Surface Design". A relationship between design factors and response values was realized and cutting conditions of micro end-milling processes were optimized by using an optimization program called VisualDOC