Modelling of Fuzzy Inference System for Micro Milling—A Preliminary Study Through FEM

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Abstract:
Ball end milling process is one of the high-precision processes in fabricating spline and curve feature in manufactured components and parts. However, due to its complex geometrical feature, it is suggested to utilize expensive high-end tools to maintain its output accuracy during production due to its limited tool life. However, to utilize downscale tools, an online monitoring system is proposed as a method in observing machining process in real time and preventive or diversion action can be taken. The paper is going to discuss on the modelling of analog to fuzzy inference system during the ball end milling process, as a motivation on the application of artificial intelligence into manufacturing sector. In current stage of the study, ideal ball end-milling cutting force output signal is estimated through finite-element simulation and analog to fuzzy inference system is modelled. Parameters such as cutting speed, feed rate and depth of cut are analyzed and it is expected that this method will optimize the application of end milling tool especially high precision micro ball end mill during the machining processes.

Keywords: Fabricating spline; Fuzzy inference; Preliminary; Micro Milling

ACKNOWLEDGMENT