Toolpath Optimization for Minimizing Airtime During Machining


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Abstract

This paper describes an algorithm for minimizing the nonproductive time or 'airtime' for milling by optimally connecting different toolpath segments. This problem is formulated as a generalized traveling salesman problem with precedence constraints and is solved using a heuristic method. The performance of the heuristic algorithm and the amount of improvement obtained for different problem sizes is also presented. This algorithm has been implemented in an automated process planning system and can be applied easily to other areas of path planning optimization like fused deposition modeling and laser cutting.