

Optimization of a Sequence for Multi-Cutting Tool Operations in CNC Machines

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Abstract—Optimizing the sequence of operations (SOS) is important factor in improving the productivity of machines and reducing the production cost. However, CNC programming packages are available and have been significantly improved program generation for CNC machines, but in most of these packages the SOS optimization is not considered. This paper, introduce an efficient solution to optimized SOS for multi-cutting tools operations located asymmetrically. A well-known genetic algorithm (GA) is utilized to solve the SOS problem. After optimizing SOS, its related CNC program will be generated. The operation' locations are considered as cities of Traveling Salesman Problem (TSP), and the cutting tool is considered as traveling salesman, by this way, TSP methodology can be modified to formulate the SOS problem. GA and the modified TSP can be incorporated into CNC programming packages to optimize the SOS before the program generation.

Index Terms—CNC, Sequence of Operations, Optimization, GA, TSP

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