

基于遗传算法的数字制造加工方案多目标优化

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关键词: 工艺方案 遗传算法 层次分析法 多目标优化

摘要: 建立了基于遗传算法的多目标优化模型,将各种影响因素分为加工时间、加工成本和加工质量三大类,利用层次分析法建立分层评价阶梯树,根据客户对评价因素重要程度的不同需求确定权重,进行加工方案的选择和优化。将该方法应用于主轴箱的表面和孔加工过程中,实例表明多目标优化模型能够简单、有效、客观地根据对评价因素的不同要求选择出最优的加工方案。 For the high-speed development of technology, there are a lot of different machining schemes for one part. The selection of machining scheme is a multi-objective problem. A method based on genetic algorithms (GA) was proposed to find out the set of Pareto-optimal solutions for multi-objective digital machining scheme selection. To deal with multi-objective and enable the engineer to make decision on different demands, an analytic hierarchy process (AHP) was implemented in the proposed procedure to determine the weight value of evaluation indexes. Three conflicting objectives: cost, quality and operation time, were simultaneously optimized. The processing of hole and surface of headstock was used as an example to prove the validity of the hybrid algorithm.

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