

基于瞬时切削力和实体模型的三轴铣削仿真与试验Simulation of 3-Axis Milling Based on Solid Model and Instantaneous Force

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关键词: 实体模型 瞬时切削力 数控加工仿真 刀具移动扫描体

摘要: 引入加工面生成点概念, 提出基于瞬时切削力的刀具变形计算和变形刀具移动扫描体的实体建模方法, 通过布尔运算生成包含有几何与物理误差的仿真加工模型, 以图形动态显示仿真加工模型的生成过程, 并给出精确测量仿真加工模型的方法; 采用PARASOLID建模核心和OpenGL对上述算法完成系统实现。仿真和实际加工试验结果表明, 最大仿真误差为0.012mm、最小仿真误差为0.004mm, 平均仿真误差为0.008mm。By introducing the concept of surface generation points, an instantaneous force based tool deformation calculation method and the solid modeling method of deformed tool swept volume were proposed, and the solid model of machining simulation including geometry and physical errors were generated. The machining process was shown by computer graphics dynamically and the measurement method for solid model of machining simulation was also presented. The whole system was implemented by using OpenGL and PARASOLID modeling kernel. The result of machining simulations case study and the actual machining experiments indicate that the maximum and minimum simulation errors were 0.012mm and 0.004mm respectively, and the average error was 0.008mm.

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