

三角网格曲面高精度刀轨快速生成算法 Research on High Precision and Fast Generation Algorithm of NC Tool Path for Triangular Mesh Surface

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摘要: 提出一种三角网格曲面刀轨生成算法, 该算法引入R*-tree索引结构并对其进行改进, 建立三角网格曲面的三维空间索引结构, 快速获取局部型面参考数据并分析其微分几何性质, 基于局部型面1阶连续约束条件, 采用抛物线逼近网格边界, 实现三角网格曲面精度补偿, 对网格边界曲线与刀轨截面求交获取刀位数据, 对其排序生成刀轨, 实例表明该算法数据适应性强, 生成数控加工刀轨精度高, 算法运行速度快。 A new high precision and fast generation algorithm of NC tool path for triangular mesh surface was proposed, which included four steps: the first, the topological structure of the triangular mesh surface was organized by improving the R*-tree spacial index structure; the second, triangular patches were obtained based on R*-tree spacial index structure and their geometric characteristics were analyzed; the third, parabola was adopted to approximate grid borders based on the first-order continuous; the fourth, the numerical control tool path was obtained through offsetting and sorting the cutter-contact points which were calculated by intersecting between the parabola and tool section. The experimental result proves that the algorithm data have strong adaptability with high precision numerical control tool path.

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