

基于周期性延伸的三次B样条闭曲线插值 Interpolation of Cubic B-spline Closed Curve Based on Periodic Extension

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关键词: 闭曲线 三次B样条插值 带状阵 周期性延伸

摘要: 针对闭曲线具有可周期性延伸的特点, 提出了一种基于求解双列带状线性方程组的三次B样条完全闭曲线插算法。通过节点向量和控制点在曲线闭合点两端的周期性延伸, 使插值曲线在闭合点实现了理论上的完全封闭。针对曲线插值线性方程组中系数矩阵具有不完全带状的特点, 提出了一种双列带状线性方程组求解算法。应用实例表明, 算法性能稳定、效率高、可插值任意形状的复杂闭曲线, 适于处理大数据量闭曲线插值运算。 According to the periodic extension fact for closed curve, a method of cubic B-spline interpolation for closed curve was proposed. By extending knots and control points, the interpolated curve closed entirely at closing point. Considering the character of incomplete band matrix for coefficient matrix of interpolation system of equations, an algorithm for solving linear banded system of equations with two columns of non-zero elements was introduced to improve the computational efficiency. Examples of application show that the proposed technology has the stable performance and high efficiency, can be used to interpolate complex closed curve with whatever shape, and it is especially useful for problems with large number of data points.

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