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基于遗传算法和最小二乘法的曲面匹配

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SURFACES MATCHING ALGORITHM BASED ON GENETIC ALGORITHM AND LEAST SQUARE CRITERION

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摘要	参考文献	相关文章

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摘要 针对基于最小二乘法的 ICP曲面匹配算法难以处理待比较曲面的局部大变形问题,提出一种改进算法。即采用遗传算法确定曲面初始相对位置以保证匹配优化结果为全局最优值,利用 ICP算法匹配结果构造偏差阈值,以此阈值过滤点群后再以最小二乘法进行匹配处理,消除局部大变形影响,获得合理的变换矩阵。以此变换矩阵变换初始点群再进行误差计算,从而获得理想的匹配结果。试验表明,该准则对局部大变形的处理效果优于常规的最小二乘 ICP曲面匹配算法。

关键词: 曲面匹配   误差评估   遗传算法   最小二乘法

Abstract： The iterative closest point (ICP) surfaces matching algorithm based on the least square criterion leads to biggish errors when there are local high distortions in the surface to be valued. A new algorithm based on Genetic Algorithm and least square criterion were proposed in this paper. To insure the result be a global optimization, a Genetic Algorithm was used to get an appropriate initial position. With the result of ICP algorithm, an error threshold was constructed to filtrate the points set, in this way, the local high distortions points were eliminated, and then the transform matrix was gotten. Transforming the initial points set with the matrix, a perfect matching result could be achievied. The following examples showed that the matching results were better than those of the routine ICP method.

Keywords： sur faces m atching   err or evaluatio n   g enetic alg or ithm   lea st square

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