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### 基于螺旋理论的机械手最优位姿轨迹规划方法研究

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### SCREW THEORY BASED OPTIMAL TRAJECTORY PLANNING FOR ROBOT MANIPULATORS

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摘要

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摘要 提出了一种在笛卡儿空间实现机器人操作手最优位姿轨迹规划新方法。基于欧拉刚体有限转动定理, 根据旋量理论和计算几何中三维直纹面路程参数生成原理, 求以等效角位移矢量在空间的运动轨迹形成的直纹曲面面积及其变化率并考虑运动时的灵活性为泛函的泛函极值来实现以路径最短、运动灵活性最好、或动力学性能最优为目标的机器人位置和姿态轨迹优化生成, 建立了相应的优化数学模型及求解方法。最后, 用该方法对三自由度平面机器人操作手进行了仿真计算。

关键词:

Abstract: A novel method of optimal trajectory planning for robot manipulators in Cartesian space is presented based on the screw theory and the method of generating three dimension ruled surfaces, by determining the maximum or minimum value of the functional of the area and its change rate of the three dimension ruled surface generated by the locus of space motion of the orientation vector of robots. The simulation result of a 3 degree of freedom planar robot manipulator shows that the method is efficient.

Keywords:

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