

简报

利用改进威胁模型的电势理论的三维飞行路径规划

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摘要:

用改进威胁模型规划后的电势理论划出实用的三维航迹.对有地形威胁和雷达、火力威胁的各种情况进行了分类、分析,并推出计算公式.通过限定搜索范围为包含起始点和目标点之间的矩形区域,不但减少了计算的复杂度,而且保证飞行路线收敛于目标点.用坡度限制平滑算法和用曲率限制平滑算法对上述航迹的法向加速度和曲率进行约束,得到符合飞行器机动性的飞行路线.

关键词: 电势理论 综合威胁场 三维航迹规划 威胁回避 高程矩阵

Three-dimensional flight path planning using electric potential theory with improved threat model

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Abstract:

An improved threat model of potential field theory is used to plan practical 3D track. Terrain, radar, and fire threats are classified and analyzed, and formulas are deduced. Search field is limited within a rectangle zone including the start point and destination, which reduces complexity of calculation and ensures convergence to destination. The flight line is confined by using the gradient restriction smoothing algorithm and curvature limit smoothing algorithm, which is suitable for aircraft mobility.

Keywords: potential field theory comprehensive threats field 3D flight planning threat avoidance elevation matrix

收稿日期 2010-05-10 修回日期 2010-09-09 网络版发布日期

DOI:

基金项目:

国家自然科学基金(40871188)资助

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