工程与应用

微粒群算法在机器人路径规划中的应用

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摘要　　提出并研究了一种应用于机器人路径规划的改进微粒群算法;提出了矢量编码方案，有效地避免了对地图建模过程的依赖;在解的评价函数中引入了障碍物排斥函数项，实现了关于所求路径到障碍物距离的优化。最后，在基本微粒群算法的基础上引入了交叉算子和变异算子，使得算法在保持较高收敛速度的同时能够很好的避免陷入局部最优点。计算机仿真结果表明了改进算法相对于基本微粒群算法的优越性，并在100次的重复实验中达到了100%的成功率。

关键词　微粒群算法　机器人路径规划　交叉算子　变异算子

分类号

Application of PSO in robotic path planning

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Abstract

In this paper，the application of Particle Swarm Optimization in robotic path planning is studied.We proposed a novel encoding method to represent each path in solution space which makes it possible to avoid the time-consuming environment modeling process.With an obstacle repulsion term being added in the cost function，optimization for robot-obstacle distance is realized.By introducing crossover and mutation operator to the basic PSO algorithm，some noticeable improvement in algorithm performance is achieved.The results of computer simulation demonstrates the superiority of the enhanced algorithm.

Key words　Particle Swarm Optimization　robotic path planning　crossover operator　mutation operator

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