激素调节机制IAGA在作业车间调度中的应用 Job-shop Scheduling Problem Based on Improved Adaptive Genetic Algorithm with Hormone Modulation Mechanism

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关键词： 作业车间调度 激素调节机制 优化 改进型自适应遗传算法

摘 要： 针对离散型生产作业中的车间调度问题，以最大流程时间最小化为目标，将基于激素调节机制的改进型自适应遗传算法应用其中。该算法具有有效避免近亲繁殖、无需复制操作、有效克服早熟现象和进化缓慢问题等特点。算法采用基于工序的编码方式，并在调度实例应用中取得满意效果。仿真结果表明：该算法大幅度减少了调度方案生成时间，优化了调度方案，缩减了最小化完工时间，能够有效、高质量地解决作业车间调度问题。 Aiming at job-shop scheduling problem with a view of minimizing the maximal makespan, an improved adaptive genetic algorithm based on hormone modulation mechanism was employed. This algorithm has such characteristics as avoiding inbreeding efficiently, no needing reproductive operation, overcoming premature phenomenon and slow evolution. An operation-based code was applied to job-shop scheduling problems along with the satisfied results. Numerical simulation demonstrated that within the framework of the newly designed improved adaptive genetic algorithm based on hormone modulation mechanism, the needed time for new optimal scheduling project and the minimal makespan were decreased, therefore the NP-hard job-shop scheduling problem can be solved efficiently.

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