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RESEARCH PAPERS

多目标进化算法求解过程综合中的混合整数线性规划(MILP)与混合整数非线性规划问题(MINLP)

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摘要 Steady-state non-dominated sorting genetic algorithm (SNSGA), a new form of multi-objective
genetic algorithm, is implemented by combining the steady-state idea in steady-state genetic algorithms (SSGA) and the fitness assignment strategy of non-dominated sorting genetic algorithm (NSGA). The fitness assignment strategy is improved and a new self-adjustment scheme of σshare is proposed. This algorithm is proved to be very efficient both computationally and in terms of the quality of the Pareto fronts produced with five test problems including GA difficult problem and GA deceptive one. Finally, SNSGA is introduced to solve multi-objective mixed integer linear programming (MILP) and mixed integer non-linear programming (MINLP) problems in process synthesis.

关键词 multi-objective programming multi-objective evolutionary algorithm steady-state non-dominated sorting genetic algorithm process synthesis

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Multi-objective Evolutionary Algorithms for MILP and MINLP in Process Synthesis

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Abstract Steady-state non-dominated sorting genetic algorithm (SNSGA), a new form of multi-objective genetic algorithm, is implemented by combining the steady-state idea in steady-state genetic algorithms (SSGA) and the fitness assignment strategy of non-dominated sorting genetic algorithm (NSGA). The fitness assignment strategy is improved and a new self-adjustment scheme of σshare is proposed. This algorithm is proved to be very efficient both computationally and in terms of the quality of the Pareto fronts produced with five test problems including GA difficult problem and GA deceptive one. Finally, SNSGA is introduced to solve multi-objective mixed integer linear programming (MILP) and mixed integer non-linear programming (MINLP) problems in process synthesis.

Key words multi-objective programming; multi-objective evolutionary algorithm; steady-state non-dominated sorting genetic algorithm; process synthesis

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