

SYSTEM ENGINEERING

用伪并行遗传/模拟退火算法进行多流股换热器网络综合的研究

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**摘要** The multi-stream heat exchanger network synthesis (HENS) problem can be formulated as a mixed integer nonlinear programming model according to Yee et al. Its nonconvexity nature leads to existence of more than one optimum and computational difficulty for traditional algorithms to find the global optimum. Compared with deterministic algorithms, evolutionary computation provides a promising approach to tackle this problem. In this paper, a mathematical model of multi-stream heat exchangers network synthesis problem is setup. Different from the assumption of isothermal mixing of stream splits and thus linearity constraints of Yee et al., non-isothermal mixing is supported. As a consequence, nonlinear constraints are resulted and nonconvexity of the objective function is added. To solve the mathematical model, an algorithm named GA/SA (parallel genetic/simulated annealing algorithm) is detailed for application to the multi-stream heat exchanger network synthesis problem. The performance of the proposed approach is demonstrated with three examples and the obtained solutions indicate the presented approach is effective for multi-stream HENS.

**关键词** [multi-stream heat exchanger network synthesis](#) [non-isothermal mixing](#) [mixed integer nonlinear programming model](#) [genetic algorithm](#) [simulated annealing algorithm](#) [hybrid algorithm](#)

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**Study on Multi-stream Heat Exchanger Network Synthesis with Parallel Genetic/Simulated Annealing Algorithm**

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