Abstract

This paper presents a new strategy to synthesis optimum controllable heat exchanger networks; the proposed strategy consists of four sequential steps: i) Quantification of index of structural controllability. ii) Exergy analysis and normalized irreversibility. iii) Thermal effectiveness of network. iv) Fuzzy analogical gates network and selection of the best weight index. Two analogical gates (symmetric and asymmetric) are employed. The symmetric gate (AND gate) inputs are the index controllability and thermal effectiveness. The asymmetric gate (Invoke gate) inputs are the output of the AND gate and the normalized irreversibility. The proposed method has been applied for two problems well-known in published literature. The results of these case studies show that the present strategy is both robust and accurate when the index of controllability is the same for different networks and it's hard to decide the optimum
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controllable network, also, from the view point of exergy and thermal effectiveness.

References

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Index Terms

Computer Science

Control Systems

Keywords

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Heat exchanger networks
Process synthesis
Exergy analysis
Thermal effectiveness
Irreversibility
Fuzzy analogical gates.