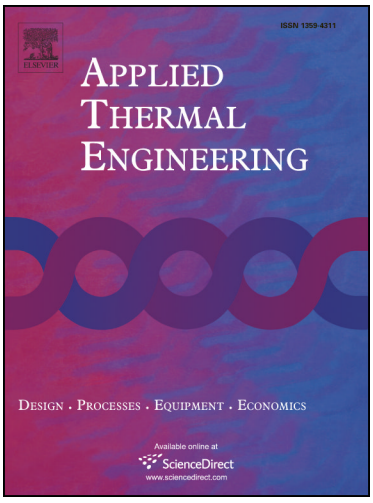

Research Paper

Heat and mass recirculations strategies for improving the thermal efficiency and environmental emission of a gas-turbine cycle

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Heat and mass recirculations strategies for improving the thermal efficiency and environmental emission of a gas-turbine cycle

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Abstract

Thermal efficiency and emission of a gas-turbine cycle were improved through consideration of heat and mass recirculations. In this regard, three potential scenarios were investigated: using lone mass circulation, only heat recirculation, and both types of recirculation at the same time. In each scenario, the maximum potential improvement was found by multi-objective optimization. Furthermore, in the case of only heat circulation scenario, the best heat recirculator was chosen by comparing a tubular with a plate-fin heat exchanger (PFHE) a well-known decision-making method which is called analytical hierarchy process (AHP). Finally, AHP method was employed again to select the superior scenario for improving the gas cycle. According to the results, the best scenario was the scenario in which heat recirculation with