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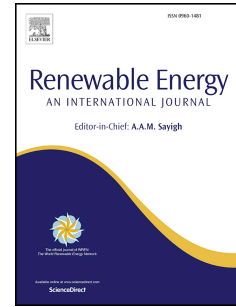
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A comparative thermo-ecological performance analysis of generalized irreversible solar-driven heat engines

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Abstract

In this study, an analysis based upon thermo-ecology criteria has been performed for an irreversible solar-driven heat engine. In the conceived heat engine, heat is transferred by using simultaneous radiation and convection mode from the source at high temperature to the heat engine side and by using convection mode from the heat engine to the source at low temperature. The influences of the optimization variables on the thermo-ecologic performance have been observed by using the ecologic objective function and the ecological coefficient of performance (*ECOP*). Also various performance factors of the heat engine, such as thermal efficiency, power output, loss rate of availability and temperatures of the working fluid have been discussed in detail by considering the maximum ecological coefficient of performance, maximum ecological function and maximum power output conditions. The entropy generation rate at maximum *ECOP* is less than at maximum ecologic objective function conditions, while the power output at maximum *ECOP* is less than at maximum ecologic objective function conditions.

Keywords: Ecological coefficient of performance; Solar heat engine; Irreversible; Optimization; Performance analysis.

1. Introduction

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