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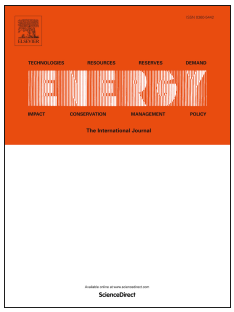

Many-objective thermodynamic optimization of Stirling heat engine

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ACCEPTED MANUSCRIPT

# Many-objective thermodynamic optimization of Stirling heat engine

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**Abstract:**

This paper presents a rigorous investigation of many-objective (four-objective) thermodynamic optimization of a Stirling heat engine. Many-objective optimization problem is formed by considering maximization of thermal efficiency, power output, ecological function and exergy efficiency. Multi-objective heat transfer search (MOHTS) algorithm is proposed and applied to obtain a set of Pareto-optimal points. Many objective optimization results form a solution in a four dimensional hyper objective space and for visualization it is represented on a two dimension objective space. Thus, results of four-objective optimization are represented by six Pareto fronts in two dimension objective space. These six Pareto fronts are compared with their corresponding two-objective Pareto fronts. Quantitative assessment of the obtained Pareto solutions is reported in terms of spread and the spacing measures. Different decision making approaches such as LINMAP, TOPSIS and fuzzy are used to select a final optimal solution from Pareto optimal set

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