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SOLAR-ASSISTED JOULE-BRAYTON ENGINES USED TO REDUCE CARBON DIOXIDE EMISSIONS

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Abstract

The paper presents a comprehensive method to assess cycle irreversibility based on two numbers of irreversibility, external and internal. These two numbers allow highlighting separately the entropy generation by irreversibility plainly inside the first law efficiency. The number of external irreversibility is the ratio of the second law effectiveness of the cycle's heat exchangers, which were set up by the concept of NTUS – number of transfer units per reversible entropy variation of the working fluid. The number of internal irreversibility manages the irreversible entropy production along the cycle. The paper includes selected numerical results regarding the internal irreversibility connected to the nature of the working fluid in a Joule-Brayton engine cycle, and additionally the reduction of CO_2 emissions of these solar assisted engines.

Key words: CO_2 emissions, irreversibility, Joule-Brayton, solar assisted engine, working fluid

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