









Enhancing the performance of a Novel multigeneration system with electricity, heating, cooling, and freshwater products using genetic algorithm optimization and analysis of energy, exergy, and entransy phenomena

Tao Hai ^{a, b, c} , Masood Ashraf Ali ^d  , As'ad Alizadeh ^e  , Aman Sharma ^f,
Ahmed Sayed Mohammed Metwally ^g, Mirzat Ullah ^h, Masoumeh Tavasoli ⁱ

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Abstract

The fuzzy proposed system is a multigeneration system capable of producing different multi-products including power, cooling, heating, and fresh water. The energy required for the operation of the system is geothermal renewable energy, which is a very serious issue in the green transient. To analyze the function of the suggested subsystems, such thermodynamic rules have been considered as an important tool. Another important parameter that is evaluated is the entransy parameter that evaluates the function of thermodynamic cycles. In this study, the rate of \dot{G}_{loss} is achieved at 699699KW.K. The results of the suggested system demonstrate the rate of electrical power is 226.1KW, the rate of cooling load is 24.5KW, freshwater production is 0.235kg/s, and the heating load is 418.5KW of the system output products. In addition, energy efficiency and exergy are calculated as 59.51% and 51.5%, respectively. To provide an optimal performance state of the system, a multi-objective optimization method with a genetic algorithm method is used to optimize the objective functions (\dot{G}_{loss} and η_{II}) of Matlab software. In this research, it has been attempted to reduce entransy and increase exergy efficiency using algorithm genetic (GA).