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## Exergy and exergoeconomic analysis and optimisation of diesel engine based Combined Heat and Power (CHP) system using genetic algorithm

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**Abstract:** In the present study, a diesel engine based Combined Heat and Power (CHP) system is optimised using exergoeconomic concept and genetic algorithm. For this purpose, the CHP system is first thermodynamically analysed through energy and exergy. Then cost balances and auxiliary equations are applied to subsystems. Finally an objective function representing fuel cost, cost of exergy loss and destruction and purchase and maintenance cost of the system components is considered for the optimisation study. Furthermore the above procedure is applied for a case study that produces 277 kW of electricity and 282 kW of heat. Also exergetic and exergoeconomic parameters are calculated in optimum case and compared with the base case. The results show that by applying the optimisation approach for our case study, 8.02% reduction in objective function is achieved which is might be considerable in CHP systems optimisation.

**Keywords:** energy; exergy; exergoeconomics; optimisation; genetic algorithm; CHP; combined heat and power; diesel engine.

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