Thermodynamic Analysis of a Vapor Absorption System Using Modified Gouy-Stodola Equation

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Abstract : In this paper, the exergy analysis of vapor absorption refrigeration system using LiBr-H2O as working fluid is carried out with the modified Gouy-Stodola approach rather than the classical Gouy-Stodola equation and effect of varying input parameters is also studied on the performance of the system. As the modified approach uses the concept of effective temperature, the mathematical expressions for effective temperature have been formulated and calculated for each component of the system. Various constraints and equations are used to develop program in EES to solve these equations. The main aim of this analysis is to determine the performance of the system and the components having major irreversible loss. Results show that exergy destruction rate is considerable in absorber and generator followed by evaporator and condenser. There is an increase in exergy destruction in generator, absorber and condenser and decrease in the evaporator by the modified approach as compared to the conventional approach. The value of exergy determined by the modified Gouy Stodola equation deviates maximum i.e. 26% in the generator as compared to the exergy calculated by the classical Gouy-Stodola method.

Keywords : exergy analysis, Gouy-Stodola, refrigeration, vapor absorption

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