ROLE OF HARMONIC MEAN ISENTROPIC EXPONENT IN THE ANALYSIS OF CLOSED CYCLE GAS TURBINE POWER PLANT CYCLE WITH INTERCOOLER

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Abstract

This technical paper presents investigation of closed cycle gas turbine power plant cycle with intercooler on the basis of harmonic mean isentropic exponent. The analysis takes account of the variation of specific heats of the working fluid by treating the flow through the compressor and the flow through the turbine as different perfect gases. In the analysis the isentropic exponent has been replaced by the harmonic mean of those used for the compressor and the turbine. An analytical expression is also derived for the pressure ratio corresponding to maximum power and maximum dimensionless net work output. It is found that the pressure ratio corresponding to maximum power and the maximum non dimensional net work is high when the ratio of extreme temperatures of cycle (i.e. T_{max} and T_{min}) and isentropic efficiencies of compressor and turbine (i.e. η_c and η_t) are high.