

ANALYSE OF THE DUAL-CYCLE NON-ADIABATICITY AT A MAXIMUM IMPOSED CYCLE TEMPERATURE

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Abstract

The constraints in term of pollution are increasingly severe; the formation of some pollutants is directly related to the rise in the temperature during combustion mainly the NO_x. The materials constitutive of the engines also limit, for thermo mechanical reasons, the maximum temperature of combustion. A thermodynamic model of engine following a non-adiabatic dual cycle is presented. The heat losses are modeled all along the cycle by the means of an heat transfer conductance and polytropic transformation. The expressions of work and efficiency are clarified in the general case with an unspecified distribution of isochoric and isobaric combustions. The model makes it possible to have the expressions of an adiabatic mixed cycle, but also of the OTTO and DIESEL limit cycles. A parametric study of the engine is presented; it allows to consider influence (strong or weak) of main parameters on maximum power and engine efficiency.

Keywords

dual cycle, heat transfer, modeling, maximum temperature