

2007-01-2778

Improving the Longitudinal Vehicle Acceleration Performance by Engine Optimization through 1D Numerical Simulation

Rafael Licen Santos, Clayton Barcelos Zabeu, Germano Moreira de Almeida
MAHLE Powertrain Brazil

Mauricio Leite Mendes, Ricardo Furlani, Rafael Bruno Bertoncini
PSA Peugeot-Citroen

ABSTRACT

This paper presents how a 1D engine simulation tool can be used in the optimization process of a naturally aspirated spark-ignition engine, evaluating the vehicle acceleration performance through engine-vehicle coupling model based.

The main objective is to compare two engine configurations, one focusing on the high torque at low speeds and the other focusing on high power at high speeds, with a baseline one. Later on the two configurations were compared in order to choose the best one to be implemented in the automotive market.

The main steps and data used for the model validation and performance improvements through simulation and model-based optimization are described in the paper. As final results, the vehicle acceleration time was decreased and the maximum vehicle speed was increased in comparison with the baseline configuration.