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Model of a new powertrain concept based on the integration of electric generation, energy recovery and storage

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The growing need for a sustainable transport has brought researches a potential improvement of the engine thermal efficiency. In that line, more than 50% of the available energy from the fuel is not used in Gas Engines. In order to recover part of this energy, a global approach which integrates a combination of different alternatives to increase the system efficiency is of major relevance and in that direction the development of accurate models is crucial. In this contribution a dynamic model in order to analyze the potential of a new powertrain concept focused on the recovery of a portion of kinetic energy and waste gases heat is presented. The model analyzes the beltless engine concept based on the electrification of the main auxiliaries and the implementation of a kinetic energy recovery system and the use of the heat from exhaust gases through a thermoelectric generator and a turbo-component. The model has a modular structure allowing changes on the circuit configurations and on the present components. The model architecture makes easier to the study and determination of the most suitable configurations, the optimum control of the system and the possible obtained benefits in terms of fuel saving for a target driving cycle based on European heavy duties roads, speed and torque. The global structure of the model allows anticipating the impact of every possible condition/element modification and gives the capability of analyzing the effect of the components within a whole system and not only in one part of it.

Biography

Estefania Hervas Blasco is an Engineer from the Politechnical University of Valencia (UPV). She is a PhD student (on optimization of thermal systems consumption) at the Energy Engineering Institute within a team composed by Emilio Navarro Peris and José Miguel Corberán.

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