LABORATOIRE D'ELECTROTECHNIQUE ET D'ELECTRONIQUE DE PUISSANCE DE LILLE

TECHNICAL UNIVERSITY OF EINDHOVEN

Master project, 2017-2018

— *Energy management of a CVT-based hybrid truck* —

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Context

New transportation systems have to be developed to face the increase of pollution and the depletion of petroleum resources. Hybrid Electric Vehicles (HEVs) and Electric Vehicles (EVs) are developed as short term solutions.
MEGEVH is a French scientific network which aims to propose generic methodology for efficient energy management of different EVs and HEVs, independently of the kind of vehicle. EMR and inversion-based control, has been intensively used in that objective [Bouscayrol 10].

New components are introduced in HEVS such as CVT (Continuous Variable Transmission), EVT (Electric Variable Transmission), SPG or DPG (Single or Double Planetary Gear Train) in order to improve their performances. But Energy Management Strategies (EMS) of vehicles including such new transmission is complex to develop. The Mechanical department of Technical University of Eindhoven (TU/e) is working on optimization-based EMS of this kind of vehicles, especially CVT-based HEV [Hofman 09].

First collaborations have led to develop a simplified EMR and inversion-based control of a CVT-based HEV [Desresveaux 16], [Mayet 17]. This projects aims to extend these first results to a hybrid truck within the framework of CE2I-IDEAL project, which aims to compare different hybrid trucks using innovative and integrated solutions

Objective

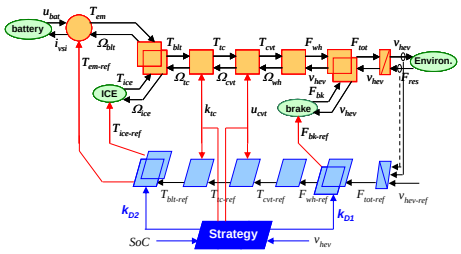
The project deals with the development of an optimization-based energy management strategy of a CVT-based hybrid truck. The strategy will be defined according to the control structure deduced from the EMR of the vehicle.
Scientific axis of the control team*: development of strategy deduced from EMR*

Work steps

The first part of the work will be realised at the University of Lille. It consists in the simulation of the study of the actual control of the CVT-based hybrid truck. The second part will be achieved at the Technical University of Eindhoven. It consists in the development of optimal energy management strategies (EMS) in function of different drive cycles and operation modes.

Key word

Hybrid Electric Vehicle, Energetic Macroscopic Representation, Energy Management Strategy



Inversion-based control of the traction part of the studied vehicle

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