

Energy sources and Energy management for Electric & Hybrid vehicles

Prof. Loïc Boulon

Université du Québec à Trois-Rivières

Hydrogen Research Institute

Canada Research Chair in Energy Sources for the Vehicles of the Future

Abstract:

Energy sources are an important latch of electrified vehicles. Classical autonomy and recharge duration for battery vehicles are about 100 to 200 km and several hours, respectively. To tackle this issue, manufacturers have introduced the hybrid electric Vehicles (which includes electric AND gasoline subsystems). More recently, hydrogen electric vehicles have been launched on the market and promise the same recharge duration and range performances than gasoline vehicles with no local emissions.

This lecture presents the different technology and configuration for the energy sources and the powertrain. The main limitation will be detailed, as well as the internal behaviors to be taken into account for the energy managements. Indeed, the energy management of a multi-source vehicle has two levels of management. (i) The local management of each source (temperature for instance). (ii) The power split between the sources toward the global energy management. These managements are designed to minimize the energy consumption but other criteria should be considered (e.g. lifetime of the subsystems).

About the lecturer:



Loïc Boulon received the master degree in electrical and automatic control engineering from the University of Lille (France), in 2006. Then, he obtained a PhD in electrical engineering from University of Franche-Comté (France). Since 2010, he is a professor at UQTR and he works into the Hydrogen Research Institute (Full Professor since 2016).

His work deals with modeling, control and energy management of multiphysics systems. His research interests include hybrid electric vehicles, energy and power sources (especially battery in cold weather operation), and fuel cell systems. He has published more than 100 scientific papers in peer-reviewed international journals and international conferences.

In 2015, Loïc Boulon was general chair of the IEEE-Vehicular Power and Propulsion Conference in Montréal (QC, Canada). Prof. Loïc Boulon is VP-Motor Vehicles of the IEEE Vehicular Technology Society and he is the holder of the Canada Research Chair in Energy Sources for the Vehicles of the future.