LAU
الجامعة اللبنانية الأميركية
Lebanese American University

Department of Industrial and Mechanical Engineering

Project I Description

Project Name: **Design and modeling of Parallel Hybrid Electric Vehicle Using Energetic Macroscopic Representation**

Team Size: **2 MEE Students**

Project Overview

Energetic Macroscopic Representation (EMR) is a multi-physical graphical functional description of energetic systems based on the physical causality and the cognitive Systemic. EMR highlights the energetic properties of the subsystems of a whole system in order to deduce its control scheme in a systematic way. (*http://www.emrwebsite.org*)

This project consists of modeling a hybrid powertrain similar to the future Peugeot 308 hybrid (HY2), and the design of its energy management strategy using EMR. The cabin thermal model will be considered while accounting the vehicle total consumption.

The HY2 powertrain is a P2 parallel hybrid, combining a downsized internal combustion engine to an electric machine. A basic control strategy using engineering intuition will be established first, and then based on the optimization study done in the previous FYP (Fall 2014: Optimal Design of Parallel Hybrid Electric Vehicles Using Dynamic Programming) the basic control strategy will be optimized and tested on the developed EMR model.

This modeling exercise focuses only on the optimization of energy consumption onboard while accounting the cabin thermal load in the vehicle total consumption.

Project Areas and Majors

- Powertrain Design (2 MEE students)

Project Deliverables

- Report including the methodology used to solve the design/control problem, the EMR model, the optimal hybridization of the parallel hybrid vehicle, and the results.
- Powertrain model and its energy management strategy developed for the project.

Design Constraints