

# Mechanical design and fabrication of a parallel hybrid vehicle powertrain simulator

Hamid Nakhaei , Mahmoud Saadat Foumani

Mechanical Engineering Department, Sharif University of Technology, Tehran, Iran

1hamidnakhaei@gmail.com , saadat@sharif.edu

In this research, the mechanical section of a reduced-scale hybrid vehicle simulator was designed and fabricated. In order to scale down the vehicle dynamics, a method based on dimensional analysis was proposed. An internal combustion engine and an electric motor were selected as power sources, and then scaling was performed according to the specifications of the combustion engine. Afterwards, the power transmission system was designed first in concept and then in more detail. Finally, the design was manufactured and assembled. The study was made in conjunction with another study responsible for the controlling section of the work, conducted by Safabakhsh. The sponsor of these two research theses is Sharif University of Technology. The fabricated simulator is placed in the manufacturing laboratory of the Sharif University of Technology. The simulator fabricated in this study provided the basis for conducting a variety of research in the area of control strategy. It has shown enough flexibility to test any scaled vehicle, as the parameters and characteristics of the vehicle can be determined on a computer. Any hypothetical vehicle can be tested with this simulator by varying computer parameters to test the performance of the vehicle in different control strategies and use its results for better analysis and design.

*Key words:* Simulator; Hybrid Electric Vehicle; Control Strategy; Parallel Architecture; Design And Fabrication

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