

Energy management based on frequency decoupling: experimental results with fuel cell-electric vehicle emulator

Database

INSE, WTI-Frankfurt eG: Inspec© IET

Descriptors

BATTERY-POWERED-VEHICLES; DC-DC-POWER-CONVERTORS;
ENERGY-MANAGEMENT-SYSTEMS; FUEL-CELL-VEHICLES;
HYBRID-ELECTRIC-VEHICLES

Free Terms

energy management; frequency decoupling; fuel cell-electric vehicle emulator; frequency separation; fuel cell-battery hybrid electric vehicle; control strategy scheme; HEV; FC; main energy source; auxiliary power source; frequency splitter; low frequency content; multisources traction assembly; vehicle dynamic

Abstract

Nowadays, there is tendency to develop vehicles that use clean and renewable energies. The Fuel cell (FC) electrical vehicles (EV) use hydrogen to generate electrical energy necessary to the traction. They present several advantages compared to other vehicles, but the use of the FC alone as energy source suffers of many problems in relation with her slow dynamic, where the interest in hybridization with a second source. This paper presents a control strategy scheme based on frequency separation for Fuel cell-Battery Hybrid Electric Vehicle (HEV), using a Fuel cell (FC) as a main energy source, and a battery as an auxiliary power source. In this strategy a frequency splitter is used to routing the low frequency content of power demand into the FC and its high frequencies into the battery, taking profit from the battery as a peak power unit. In order to validate this strategy, Simulation and experimental results are carried out, using an emulator of a multi sources traction assembly taking into consideration the vehicle dynamic and the effects of external environment.

Author

[01] Achour, Yahia - E-Mail:achour@hotmail.fr; [01] Alloui, Hamza - E-Mail:alloui_hamza@yahoo.fr; [01] Marouani, Khoudir - E-Mail:marouani_khoudir@yahoo.fr; [02] Becherif, Mohamed - E-Mail:mohamed.becherif@utbm.fr

Institution

[01] Lab Commande des Machines, Ecole Militaire Polytech, Algiers - Address: Ecole Militaire Polytechnique, Laboratoire Commande des Machines, Algiers, Algeria

[02] FCLab, UTBM, Belfort - Address: UTBM, FCLab, Femto-ST, Belfort, 90010, France

Source

2015

Piscataway, NJ, USA: IEEE

Language

EN English

Publication Year

2015