Mathematical modeling and simulation of an electric vehicle

ABSTRACT

As electric vehicles become promising alternatives for sustainable and cleaner energy emissions in transportation, the modeling and simulation of electric vehicles has attracted increasing attention from researchers. This paper presents a simulation model of a full electric vehicle on the Matlab-Simulink platform to examine power flow during motoring and regeneration. The drive train components consist of a motor, a battery, a motor controller and a battery controller; modeled according to their mathematical equations. All simulation results are plotted and discussed. The torque and speed conditions during motoring and regeneration were used to determine the energy flow, and performance of the drive. This study forms the foundation for further research and development.

Keyword: Mathematical modeling; Simulation; Electric vehicle; Matlab-Simulink