LiFePO4-battery-based electric control system for hybird electric vehicles

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ABSTRACT

In recent years, owing to the environmental protection concept and the international oil price has risen, it causes to inflict losses the economic development with people life and wealth of many country. For this reason, there is fast growing interest in electric vehicle (EV) and hybrid electric vehicles (HEVs) globally. But the electric vehicle ’ s battery charging equipment is not popular and inefficiency, these defects create in the limitations of development. Therefore, at the moment, the hybrid electric vehicles become one of development mainstream in vehicle industry. The central purpose of this thesis is the design and development of a new type coupling mechanism system and its controller for the hybrid vehicle system. To make use integrated of different power resources output connection alteration, the goal of the function electronic continuously variable transmission (E-CVT) is achieved. The coupling mechanism drive by slow-start control, its rests on the different power resources speed to make it coupling modulation that to safeguard power resources output apparatus. Electric control systems used by digital signal processor (DSP) as a control core to communication and operation between various components. In electric motor control, the application of space vector pulse width modulation (SVPWM) technique is applied to the BLDC motor. Lithium iron phosphate battery (LiFePO4) is used as a storage medium and the provision of electricity to provide a more efficiency hybrid electric vehicles. A balance charging circuit is designed to extend battery cycle life. Finally, according to the construction of the experiment platform, the system has been integrated and tested to verify the electric control coupling mechanism function. Experiment results demonstrated to achieve the objective of the thesis.

Key Words: Electric vehicles, Hybrid electric vehicle, digital signal processor, space vector pulse-width-modulation, LiFePO4

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Table of Contents

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