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Abstract
Due to the rapid-spread and quick development of fuel cell, a hybrid power system combined of fuel cell and battery has attracted more and more attention in the past few years. Fuel cells are suitable for continuous power requirement but it needs an initial time to warm up if system is big. Battery can provide backup energy during system in the peak power demand period, and is capable of doing instant cold-start as the main power supply while the fuel cell is warming up. A hybrid system has many advantages over each stand-alone component, the drawbacks of the fuel cell or battery could be complement by the other.
The purpose of this thesis is to develop a prototype of a fuel cell/ battery hybrid power system, building a digital controller for power management in the hybrid system and testing the control strategies of energy flow in the system. The digital controller is the heart of the hybrid fuel cell/battery system, it controls and manages the energy flow of the system, a proper management strategy is important for both system efficiency and endurance ability.
The controller is based on a powerful microcontroller Atmega8535 which is capable of acquiring, processing data and controlling the system with appropriate setting, the battery management system was also built to control the charging/discharging process of battery. With the flexibility of programmable controller, control strategies were tested and modified according to the results.
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