

The Design of Power Regulation Strategies for a Hybrid PEMFC Power System

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Abstract

This paper discusses the effects of PEMFC power managements on the cost and reliability of a hybrid power system. The hybrid power consists of a proton exchange membrane fuel cell (PEMFC), a chemical hydrogen production system, photovoltaic arrays, and a Li-Fe secondary battery set. First, we build a simulation model by MATLAB/SimPowerSystemTM, and adjust the model parameters based on experimental responses. Second, we define the system cost and reliability indexes. Third, we apply the lab load profiles to the model, and discuss the effects of different PEMFC power regulation methods on system costs and reliability. Based on the results, suitable management strategies with corresponding component sizes can minimize system costs while satisfying the reliability requirements. In the future, the developed simulation model can be applied to develop customized power systems.