

The Benefits of Component Adjustment on a Hybrid Power PEMFC System

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Abstract

This paper develops a hybrid power model consisting of a hydrogen production system, a proton exchange membrane fuel cell (PEMFC), a secondary battery, and solar cells. First, we integrate the system, and build a simulation model by MATLAB SimPowerSystem™. The model parameters are adjusted by experimental data. Second, we define two performance indexes: system cost and reliability. Third, we consider a general household profile, and apply the model to discuss the effects on system costs and reliability by adjusting the sizes of the solar cells and battery. Based on the results, adjusting system components can significantly reduce system costs and improve system reliability. In addition, the developed hybrid PEMFC power model can effectively reduce the efforts for developing customized power systems.