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(57) Abstract :
The present disclosure relates to a computing system (100) for parameter extraction of a Proton Exchange Membrane Fuel Cell (PEMFC) (104). The parameter extraction process begins with careful experimental characterization of the PEMFC (104), including current-voltage (I-V) curves, polarization curves, and electrochemical impedance spectroscopy (EIS) measurements. These experimental data (106) provide insights into the performance limitations and dynamic behavior of the fuel cell. Next, mathematical models (108) are developed to describe the physical and electrochemical phenomena occurring within the PEMFC. These models incorporate factors such as mass transport, electrochemical kinetics, heat transfer, and water management. The models are calibrated using the experimental data (106), employing Optimization algorithms (110) to adjust the model parameters and minimize the discrepancy between the model predictions and experimental measurements. The system (100) then utilizes sensitivity analysis and Parameter estimation techniques to extract the values of the key parameters and conduct a validation process (112) on them for improving accuracy.

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