A Nonlinear Approach for System Identification of a Li-Ion Battery Based on a Non-Linear Autoregressive Exogenous Model

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Abstract : An electrochemical system is a subset of mechatronic systems that includes a wide variety of batteries and nickel-cadmium, lead-acid batteries, and lithium-ion. Those structures have several non-linear behaviors and uncertainties in their running range. This paper studies an effective technique for modeling Lithium-Ion (Li-Ion) batteries using a Nonlinear Auto-Regressive model with exogenous input (NARX). The Artificial Neural Network (ANN) is trained to employ the data collected from the battery testing process. The proposed model is implemented on a Li-Ion battery cell. Simulation of this model in MATLAB shows good accuracy of the proposed model.