

Robust Diagnosability of PEMFC Based on Bond Graph LFT

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Abstract : Fuel cell (FC) is one of the best alternatives of fossil energy. Recently, the research community of fuel cell has shown a considerable interest for diagnosis in view to ensure safety, security, and availability when faults occur in the process. The problematic for model based FC diagnosis consists in that the model is complex because of coupling of several kind of energies and the numerical values of parameters are not always known or are uncertain. The present paper deals with use of one tool: the Linear Fractional Transformation bond graph tool not only for uncertain modelling but also for monitorability (ability to detect and isolate faults) analysis and formal generation of robust fault indicators with respect to parameter uncertainties. The developed theory applied to a nonlinear FC system has proved its efficiency.

Keywords : bond graph, fuel cell, fault detection and isolation (FDI), robust diagnosis, structural analysis

Conference Title : ICECE 2015 : International Conference on Electrical and Control Engineering

Conference Location : San Francisco, United States

Conference Dates : June 07-08, 2015