

Optimal Feedback Linearization Control of PEM Fuel Cell

Authors : E. Shamsavari, R. Ghasemi, A. Akramizadeh

Abstract : This paper presents a new method to design nonlinear feedback linearization controller for polymer electrolyte membrane fuel cells (PEMFCs). A nonlinear controller is designed based on nonlinear model to prolong the stack life of PEM fuel cells. Since it is known that large deviations between hydrogen and oxygen partial pressures can cause severe membrane damage in the fuel cell, feedback linearization is applied to the PEM fuel cell system so that the deviation can be kept as small as possible during disturbances or load variations. To obtain an accurate feedback linearization controller, tuning the linear parameters are always important. So in proposed study NSGA_II method was used to tune the designed controller in aim to decrease the controller tracking error. The simulation result showed that the proposed method tuned the controller efficiently.

Keywords : nonlinear dynamic model, polymer electrolyte membrane fuel cells, feedback linearization, optimal control, NSGA_II

Conference Title : ICPCE 2014 : International Conference on Power and Control Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : November 28-29, 2014