

Article Abstract

Title:	Polymer electrolyte membrane fuel cell control with feed-forward and feedback strategy
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Abstract:	Feed-forward and feedback control is developed in this work for Polymer electrolyte membrane (PEM) fuel cell stacks. The feed-forward control is achieved using different methods, including look-up table, fuzzy logic and neural network, to improve the fuel cell stack breathing control and prevent the problem of oxygen starvation. Firstly, the feed-forward controller is used to generate directly an input voltage of the compressor according to the current demand. Then, a PID controller is used in the feedback to adjust the difference between the requested and the actual oxygen ratio by compensating the feed-forward controller output. The designed system is evaluated using a nonlinear simulation of a fuel cell model documented in the literature. The proposed feed-forward with PID controller have achieved a good control performance. The simulation showed effectiveness of the control strategy.
Keywords:	Fuel cell; fuel cell stack; breathing control; starvation; feed-forward; fuzzy logic; neural network.