Abstract

Renewable energy sources are the promising alternatives for tackling the future energy crisis. Fuel cells are one of the upcoming non-conventional energy sources nowadays. Fuel cell based PMSM drives are finding positions in Hybrid Electric Vehicles, replacing the induction motor drives for they have many advantages such as high speed, high efficiency, high torque to inertia
ratio, high power density etc., However the main problem in PMSM drives is the ripples produced in the torque. Also if these PMSM’S are used as such for HEV applications, then the performance of the HEV will not be satisfactory and the life span of the same will be lesser. Many methods have been proposed in literatures for the minimization of these ripples. In this paper a novel method of reduction of torque ripples and the enhancement of the other performance characteristics such sinusoidal input voltage and current, speed has been proposed. Further the main source of energy supply is the fuel cells. Hence this method is as a whole useful for PMSM drives which have fuel cells as their source of energy. The proposed method is validated by using MATLAB/SIMULINK. The conventional circuit and the proposed circuit are simulated and the simulated results are shown and compared. It has been observed that the proposed method gives rise to much minimized torque ripples and the enhancement of the above mentioned performance characteristics than when compared with the conventional circuit.

Reference

A Simple Method of Torque Ripple Minimization and Performance Characteristics Enhancement of Fuel Cell based PMSM Drives


Index Terms

Computer Science  
Power Systems

Key words

Non-Conventional Energy Sources  
Fuel Cells

PMSM

Tri State CSI

Freewheeling state

Torque Minimization
Performance Characteristics