

A STUDY OF REGENERATIVE MODELS IN HYDROGEN FUEL CELL

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## **ABSTRACT**

Reducing Carbon dioxide emissions is getting more attention because of global warming. The sector which is responsible for a significant amount of emissions must reduce them due to new and upcoming regulations. Using fuel cells vehicles may be one way to help to reduce the carbon dioxide emissions from transport sector. In this study a general PEMFC (Proton Exchange Membrane Fuel Cell) is taken into account because they are known for their high efficiency, low emissions and high reliability. The aim of this study is to illustrate the efforts in the search of alternative options in fuel cell technology. The overall aim of this study is to research the regenerative system models in fuel cell that can help fuel cell to achieve the highest efficiency in its operation. The regenerative system models reviewed are supercharger, turbocharger, batteries, supercapacitor and regenerative braking. The waste product produced during fuel cell reactions can be used to generate back into useful energy that can increase the efficiency of fuel cell. This study was achieved by reviewing the modeling and experimental test about supercapacitor and regenerative braking that help to optimize the fuel cell system. The supercapacitor which is used to store the electrical energy able to work better than batteries in enhancing fuel cell efficiency. The regenerative braking is also implemented in fuel cell system and is used to convert the frictional energy to electrical energy and stored into batteries or supercapacitor. This regenerative braking works better at certain speeds than others and in fact, it is the most effective in stop-and-go driving situations. Throughout this study the regenerative system models that may help the best to increase fuel cell efficiency is determined which is regenerative braking and supercapacitor.

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