

ECE-19

Programmable Multistage Power Converter For Fuel Cell Applications

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Fuel cells are electrochemical cells that generate direct current, and power converters are used to convert the DC power generated by the fuel cell to AC power, so that it can be used for different house- hold and industrial applications.

The main goal of this project was to design a programmable power converter by enhancing the analog controls of the existing 5KW/10KW power converter in the CEPE laboratory with closed loop digital controls. The existing converter was repaired in order to apply our design. Digital controls make the converter more programmable and suitable as an educational tool in the CEPE lab.

The digital control of the converter's DC bus voltage was designed using Simulink and then downloaded to a digital signal processor (DSP) using Real-Time Workshop. The Simulink interface enables students to change the programmed parameters and to visualize the results thus giving them a better understanding of the working of the converter.