World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

DC-to-DC Converters for Low-Voltage High-Power Renewable Energy Systems

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Abstract : This paper focuses on the study of DC-to-DC converters, which are suitable for low-voltage high-power applications. The output voltages generated by renewable energy sources such as photovoltaic arrays and fuel cell stacks are generally low and required to be increased to high voltage levels. Development of DC-to-DC converters, which provide high step-up voltage conversion ratios with high efficiencies and low voltage stresses is one of the main issues in the development of renewable energy systems. A procedure for three converters-conventional DC-to-DC converter, interleaved boost converter, and isolated flyback based converter, is illustrated for a given set of specifications. The selection among the converters for the given application is based on the voltage conversion ratio, efficiency, and voltage stresses.

Keywords : flyback converter, interleaved boost, photovoltaic array, fuel cell, switch stress, voltage conversion ratio, renewable energy
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020