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Research Article

Extra-High-Voltage DC-DC Boost Converters Topology with Simple Control Strategy

P. Sanjeevikumar[1] and K. Rajambal[2]

[1]Project Engineer, Simulation Solutions, Chennai, India
[2]Department of Electrical and Electronics, Pondicherry Engineering College, Pondicherry 605014, India

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Abstract

This paper presents the topology of operating DC-DC buck converter in boost mode for extra-high-voltage applications. Traditional DC-DC boost converters are used in high-voltage applications, but they are not economical due to the limited output voltage, efficiency and they require two sensors with complex control algorithm. Moreover, due to the effect of parasitic elements the output voltage and power transfer efficiency of DC-DC converters are limited. These limitations are overcome by using the voltage lift technique, opens a good way to improve the performance characteristics of DC-DC converter. The technique is applied to DC-DC converter and a simplified control algorithm in this paper. The performance of the controller is studied for both line and load disturbances. These converters perform positive DC-DC voltage increasing conversion with high power density, high efficiency, low cost in simple structure, small ripples, and wide range of control. Simulation results along theoretical analysis are provided to verify its performance.