

A Multicarrier Pulse Width Modulator for the Auxiliary Converter and the Diode Rectifier

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Abstract

The auxiliary converter (AXC) has been presented as a cost-effective solution to retrofit the conventional diode rectifier into a unity power factor and regeneration-enabled front end. The transistor-based AXC operates as an active filter when the load system consumes power. When the load system regenerates, the AXC can transfer the energy back to the ac grid. However, the pulse width modulation (PWM) switching of the AXC often causes circulating current between the AXC and the diode rectifier. The zero vectors of each PWM cycle induce zero sequence current, which results in increased operational losses and electrical noise. This study analyzes the circulating current and investigates the use of multicarrier PWM for its suppression. This multicarrier PWM can synthesize the desired output voltage without using zero vectors for the active filtering and regeneration operations of the AXC, and thus significantly suppress the circulating current and common mode voltage. Test results are presented to validate the effectiveness of the proposed multicarrier PWM in the AXC circuit system.

Keyword : Multicarrier Pulse Width Modulator , Auxiliary Converter