

A Multicarrier PWM for Parallel Three-Phase Active Front-end Converters

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Abstract

The use of parallel three-phase active front-end (AFE) converters has become more popular due to their simplicity, low cost, and expandability. However, the pulse width modulation (PWM) switching of parallel three-phase AFE converters causes circulating current. The circulating current is mainly affected by the zero vectors of each PWM cycle. This study proposes a multicarrier PWM for parallel three-phase AFE converters. The multicarrier PWM can synthesize the desired output voltage without using zero vectors. Therefore, the circulating current between parallel three-phase AFE converters will be suppressed by the multicarrier PWM scheme. Furthermore, the common mode voltage of a three-phase AFE converter is reduced by the multicarrier PWM scheme. Simulation and test results are presented to validate the performances of the proposed multicarrier PWM for parallel three-phase AFE converters.

Keyword : Active front-end (AFE) converters, circulating current, multicarrier pulse width modulation (PWM).