Overlap-time compensation technique for current-source power inverter

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Abstract	A current source type power inverter is an inverter converting the dc current source to be ac current with magnitude, frequency and phase angle can be controlled. In a voltage source inverter, a short circuit condition is prohibited, because an excessive current may destroy the inverter circuits. In contrast, because inductors are used as energy buffer, an open circuit must be avoided in the operation of a current source inverter. In order to operate inverter properly, overlap-time is attached in the firing signals of power switches to avoid open circuit condition. However, adding overlap-time will generate distortion of the ac output current. Hence, compensation of overlap-time is absolutely needed for current source inverter to output high quality current waveform. A new overlap-time compensation method for current source inverter is proposed in this paper. The method utilized triangular carriers and sinusoidal signal for modulation strategy to generate gating signals of inverter with overlap-time compensation capability. The new method was examined using computer simulations. Further, experimental tests of inverter circuits applying overlap-time compensation method were also presented and discussed. The test results verified that the proposed method worked well suppressing distortions and harmonics of the ac current waveform caused by the overlap-time.
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