

## Multilevel Current Waveform Generation Using Inductor Cells and H-Bridge Current-Source Inverter

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<b>Abstract</b>	<p>This paper presents a new circuit configuration of single-phase multilevel current-source inverter (CSI). In this new topology, a basic H-bridge CSI working as a main inverter generates a multilevel current waveform in cooperation with inductor cells connected in parallel as auxiliary circuits. Each inductor cell is composed by four unidirectional power switches with an inductor across the cell circuit. The inductor cells work by generating the intermediate level of the multilevel current waveform with no additional external dc-power sources. A simple proportional-integral controller is applied to control the intermediate-level currents of the multilevel output waveform. A five-level and a nine-level pulsewidth-modulation inverter configuration, with chopper-based dc-current sources, are verified through computer simulations. Furthermore, an experimental prototype of a five-level CSI is set up and is tested. The results show that the test circuit works properly to generate the multilevel output-current waveform with low output harmonics by using small size of inductors without any additional external dc-power sources, which proves feasibility of the proposed strategy.</p>
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