

电力电子与电力传动

光伏逆变器的调制方式分析与直流分量抑制

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摘要: 单相无变压器型全桥并网逆变器由于体积小、效率高、造价低, 被广泛地应用于低功率光伏并网系统中。在双极性脉宽调制方式下, 全桥逆变器的共模电压恒定, 不产生共模电流。但此调制方式不能消除输出电流的直流分量。为此, 提出一种新的控制算法来抑制直流分量的输出。该算法使用2个补偿环节分别抑制由于调制脉宽不对称和并网电流检测误差导致的直流分量, 无需增加外围硬件电路, 且所增加的环节只占用很少的控制芯片资源。实验结果证明了理论分析和算法的正确性。

关键词: 光伏并网系统 无变压器型全桥逆变器 调制方式 共模电流 直流分量

Modulation Mode Analysis and Suppressing DC Current of PV Inverter

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Abstract: Due to the small size, high efficiency and low cost, single-phase transformerless full-bridge inverter is widely used in low-power photovoltaic (PV) grid-connected systems. In bipolar PWM (pulse width modulation) modulation, no changes appear in the common-mode and no common-mode current is generated. However, this modulation mode would not prevent the injection of DC current into the grid. Therefore, a new control algorithm is proposed in this paper. The algorithm uses two compensation links to suppress the DC components, which were caused by pulse width imbalance in PWM process and the error in the actual current measurement. Without adding auxiliary circuit, the algorithm occupied a few control chip resources. Experimental results demonstrate the availability and correctness of the theoretical analysis and algorithm.

Keywords: photovoltaic (PV) systems transformerless full-bridge inverter modulation mode common-mode current DC components

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