

A novel flying-capacitor-damped five-level inverter based on bridge modular switched-capacitor topology is proposed in this paper. The inverter features the switched-capacitor circuit with dc-dc boosting conversion ability and the multilevel inverter circuit with flying-capacitor-clamped performance. With the special composite structure, the number of components is cut down compared to the topology of the conventional cascaded multilevel inverter. Meanwhile, part of switches can be operated under line voltage frequency, resulting in switching loss reduction. Hence, the potential of system efficiency and power density is released due to embed switched-capacitor circuit. More importantly, the optimized carrier-based phase disposition pulse width modulation method is employed as a control strategy. Under this control strategy, the capacitor voltage self-balance can be realized and quality of output waveforms can be improved significantly. After simulation, the prototype is built to validate the correctness and practicability of the analysis.