

Accurate simplified SPWM control strategy for single-phase voltage source inverter under varying grid conditions

Abstract

A single-phase Voltage Source Inverter (VSI) controller with minimal complexity and computational burden is considered attractive. However, the accuracy of its power injection should not be compromised. The simplified sinusoid pulse width modulation (SSPWM) control strategy achieves this simplicity, but the accuracy of its power demands under varying grid conditions is yet addressed. This paper now investigates the power demand accuracy of the SSPWM control strategy. An improved strategy is then proposed by incorporating an optimised Proportional Integral (PI) current regulator within the simplified control strategy to achieve accurate power demands under varying grid conditions. The strategy has been verified via detailed simulation investigations of a single-phase VSI under varying grid conditions. The simulation shows the proposed control structure is 5.1% better than the SSPWM for the injected real power.

Keywords:

Control scheme, SPWM, Voltage source inverter (VSI), Single-phase inverter, Current control