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Analysis And Implementation Of PI Controller Fordc Link Single Phase PWM Voltage Source Inverter

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Abstract: The Pulse Width Modulation (PWM) DC-to-AC inverter has been widely used in many applications due to its circuit simplicity and rugged control scheme. In the inverters, high-frequency (HF) operation reduces the filter size, which ic claimed to be the biggest advantage. The major limitation in increasing the switching frequency is the switching losses. Hence, zero voltage switching is used to reduce the switching losses. This work proposes a novel controller for enhancing the performance of the inverter. A Zero Voltage Switching (ZVS) DC link single-phase Pulse Width Modulated Voltage Source Inverter (VSI) under open loop and closed loop condition is simulated and presented. Design equations are also discussed and ZVS is achieved for both forward power flow, without increasing the voltage stress on the inverter devices. For the performance evaluation of the proposed converter in closed loop, PI controller is incorporated. The parameters such as output voltage, voltage stress, current through switches and switching losses are obtained and a detailed comparative analysis is made between open loop, closed loop using PI controller.

Keywords: Zero voltage switching, Inverter, Dc link, PI controller, Modulation strategy, Soft switching