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Effect of Inductance Ratio on Operating Frequencies of a Hybrid Resonant Inverter

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Abstract : In this paper, the performance of a medium power (25 kW/25 kHz) hybrid inverter with a reactive transformer is investigated. To analyze the sensitivity of the inverster, the RSM technique is employed to manifest the effective factors in the inverter to minimize current passing through the Insulated Bipolar Gate Transistors (IGBTs) (current stress). It is revealed that the ratio of the axillary inductor to the effective inductance of resonant inverter (N), is the most effective parameter to minimize the current stress in this type of inverter. In practice, proper selection of N mitigates the current stress over IGBTs by five times. This reduction is very helpful to keep the IGBTs at normal temperatures.

Keywords : analytical analysis, hybrid resonant inverter, reactive transformer, response surface method
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