Abstract

Selection of proper switching frequency of an inverter is very dominant factor for system reliability and performance. Model predictive control (MPC) strategy selects optimal switching state in every sampling instant for the inverter by diminishing cost function. As a result, MPC based multilevel inverter requires higher sampling frequency in comparison with pulse width modulation (PWM) which incurs higher switching frequency. So, optimal selection of switching frequency is required for enhancing system reliability and performance. This paper presents an optimum switching frequency technique for three-level neutral-point clamped (3L-NPC) inverter. The cost function of MPC based 3L-NPC inverter has three control objectives namely current tracking error, neutral point voltage balancing and, the number of switching transitions are included in the cost function with weighting factor. The value of the weighting factor in the cost function is selected by making a trade-off among the current total harmonic distortion (THD), neutral voltage balancing and, the average switching frequency. To evaluate the system performance switching loss is determined at the optimal switching frequency as well as without
Switching Frequency Selection Technique for Model Predictive Control based Multilevel Inverter

the switching frequency optimization.

References


Index Terms

Computer Science Circuits and Systems

Keywords

Model predictive control, neutral point clamped, switching loss, neutral point voltage balancing, current total harmonic distortion (THD).