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## Performance improvement of PCC and PTC methods of model-based predictive direct control strategies for electrical drives with multilevel inverter

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In power electronics, Predictive Current Control (PCC) and Predictive Torque Control (PTC) methods are advanced control strategy. To control a Permanent Magnet Synchronous Motor Machine (PMSM) or Induction Machine (IM), the PTC method evaluates the stator flux and electromagnetic torque in the cost function and PCC considers the errors between the current reference and the measured current in the cost function. The switching vector selected for the use in IGBTs minimizes the error between the references and the predicted values. The system constraints can be easily included. Both the PTC and PCC methods are most useful in direct control methods with PMSM method gives 10% to 30% more torque than an induction motor, also do not require modulator. Induction motor work on only lagging power factor means, it can produce only 70-90% of torque produced by PMSM with same current. PCC and PTC method with 15-level H-bridge multilevel inverter using PMSM reduces 23% more THD in torque, speed and stator current compared to PCC and PTC method with 15-level H-bridge multilevel inverter. In this paper, the PTC and PCC methods with 15-level H-bridge multilevel inverter using PMSM and IM are carried out; gives excellent torque and flux responses, robust and a stable operation achieved compared to the PTC and PCC methods with 2-level voltage source inverter. This novel method attracts the researchers very quickly due to its straightforward algorithm and good performances both in steady and transient states.

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