

Pole-phase modulation (PPM) is one of the effective speed and torque control techniques for multiphase induction motor (MIM) drives. Performance of the drive in low-pole high-speed mode for steady run is good even with two-level voltage excitation due to the inherent advantages of high phase number. The drive operation under high-pole high-torque starting mode suffers degradation in performance due to reduction in phase number in a way to increase number of poles. Extending conventional multilevel converter topologies for performance improvement of MIMs increases the device count and control complexity considerably. In this paper, a simple technique to generate multilevel voltage across the phase of a pole-phase-modulated induction motor (PPM IM), for improving the performance of the drive under high-pole operation is presented. The technique requires least changes in the control scheme and no additional switches for the power circuit. Exploiting the advantages of equal voltage profile coils (EVPCs) for carrier phase-shifted PWM control is the main focus of this paper. In addition, generalization of PPM is revisited in this paper to add a small constraint on the pole ratio to avoid unequal pole width for some pole-phase combinations. The effectiveness of the proposed scheme is shown through simulation with finite-element method (FEM) model of nine-phase squirrel cage induction motor and two-level nine-phase inverter cosimulated in Ansys Maxwell two-dimensional (2-D) and Simplorer environment. Experimental validation is also done on 5 hp nine-phase two-level induction motor drive controlled using Spartan6 FPGA board.