ABSTRACT:

A new Nonlinear Dynamic Inverse (NDI) method is proposed to minimise the ripple torque in an induction motor. This method is based on field oriented with space vector pulse width modulation (SVPWM). The nonlinear dynamic inverse controller cancelled a non-desirable response of the induction motor and enhancing the performance. This cancellation attempts by careful nonlinear algebraic equations. First, a mathematical model of induction motor and decoupling between two inputs have achieved. Then the desired new dynamic is derived from implementing the proposed nonlinear dynamic inverse controller (NDIC) technique that reserves some benefits such as fast torque control, minimum ripple torque, and fast speed response. Also, the proposed method significantly reduced the torque ripple which is the major concerns of the classical hysteresis-based in direct torque control (DTC) and feedback linearization control (FLC) scheme and have an effect on the stator current distortion. Finally, the simulation results with MATLAB/Simulink achieved for a 2-hp induction motor (IM) drive. The results are verification proved that the proposed (NDI-SVPWM) system achieves smaller torque ripple about 0.4% and faster torque response than the conventional SVM-based on proportional integral (PI-DTC) method.