

Article Abstract

Title:	Robust method for stator current reconstruction from DC link in a sensorless induction motor drive
Author(s):	S. B. Bodkhe ^{1*} , M. V. Aware ²
Address(es):	^{1*} Department of Electrical Engineering, G.H. Rasoni College of Engineering, Nagpur, INDIA ² Department of Electrical Engineering, Visvesvaraya National Institute of Technology, Nagpur, INDIA *Corresponding Author: e-mail: s_b_bodkhe@yahoo.co.in, Tel +91-9822718740, Fax. +91-7104-232560
Journal:	<i>International Journal of Engineering, Science and Technology</i> , Vol. 2, No. 10, 2010, pp. 87-99.
Abstract:	<p>The electronic inverters normally operate in a current controlled mode. Current controllers are prone to errors associated with nonlinearity and offsets in the current transducers. Their successful operation requires measurement of the instantaneous values of stator currents. Using the switching signals and dc link current, this paper presents a new algorithm for the reconstruction of stator currents of an inverter-fed, three-phase induction motor drive. Unlike the classical and improved methods available in literature, the proposed method is neither based on pulse width modulation pattern modification nor is a machine model based observer and therefore is independent of demerits of existing methods like higher switching loss and increased sensitivity to parameter variations. This makes it a robust solution. The proposed algorithm makes use of simple logic gates and if-else statements and as a result it generates stable three-phase current signals even during short periods of measurement. It also carries out auto-calibration of dc link current to remove the unwanted dc-offsets that are caused due to asymmetry in switching of semiconductor devices. The proposed algorithm is tested on a 2.2 kW, current-regulated, field oriented control, induction motor drive by using MATLAB/Simulink software. The simulation results show good agreement between the reconstructed waveforms and actual waveforms under different operating conditions. Experimental result on a 2.2 kW induction motor drive, using a dSPACE 1104 controller board is presented to validate the proposed algorithm.</p>
Keywords:	Algorithm, current-reconstruction, current-sensor, dc-link, hysteresis modulation, three-phase induction motor.