

Unified control structure of multi-type interior permanent magnet motor

ABSTRACT

This paper presents the control strategy structure to extract the speed torque characteristic for the newly designed three phase Multi Type Interior Permanent Magnet Motor. The proposed structure with the driving circuits exhibit the performance of torque characteristics of the stepper motor and brushless motor with independent coil winding per phase especially used as an in-wheel motor in agricultural applications. Brushless Direct Current motors exhibit characteristics of generating high torque at high speed while the Permanent Magnet Stepper motors has characteristic of generating high torque at low speed. The typical characteristics of the above two are integrated in the proposed structure with a complex control structure that handle the switching complexity and speed control in real time. Thus, a specially designed driving system is essential to drive and control this special motor. The evaluation of the motor mechanical characteristics when applying load torque is also presented. The result determines the practical torque range applicable for each motor configuration and as combined machine.

Keyword: BLDC motor; Multi-mode drive; Multi-type interior permanent magnet motor; PMST motor