An Improved Back-EMF Detection Method Of Sensorless Control On Brushless DC Motor

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ABSTRACT
In this paper, the back-EMF detection method of sensorless control on permanent magnet brushless DC motor (PMBLDC) was studied. The control unit adopts Microchip 33FJ32MC204 chip that is special purpose design. The chip combines analog and digital control and PWM module all in one chip. It is suitable for brushless DC motor sensorless control and design of power module drive.

For the sensorless control, detecting the zero-crossing points of the back-EMF was based on motor terminal voltage and neutral voltage to compare. A digital filter was confirmed the zero-crossing points signal of the back-EMF and achieve the commutation of sensorless control on PMBLDCM. According to starting program, the motor is running in open-loop operation. When the motor speed increases to a certainly large enough value to detect the zero-crossing signal of the BEMF, then the controller got into the sensorless control using PWM signal to achieve the motor speed control. The sensorless control is not required external any position sensors so that the motor drive circuit reduce cost and size by using the digital filter. The PMBLDCM also have a wide range of speed control applications.

Keywords : Permanent magnet brushless DC motor、Back-EMF、sensorless control、Pulse width modulation

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