

Title: A Sensorless PMDC Motor Speed Controller with a Logical Overcurrent Protection

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Source: Journal of Power Electronics **Volume:** 13 **Issue:** 3

Pages: 381-389 **DOI:** 10.6113/JPE.2013.13.3.381 **Published:** May 2013

Document Type: Article

Language: English

Abstract: A method to control the speed or the torque of a permanent-magnet direct current motor is presented. The rotor speed and the external torque estimation are simultaneously provided by appropriate observers. The sensorless control scheme is based on current measurement and switching states of power devices. The observer's performances are dependent on the accurate machine parameters knowledge. Sliding mode control approach was adopted for drive control, providing the suitable switching states to the chopper power devices. Despite the predictable chattering, a convenient first order switching function was considered enough to define the sliding surface and to correspond with the desired control specifications and drive performance. The experimental implementation was supported on a single dsPIC and the controller includes a logic overcurrent protection.

Author Keywords: PMDC motor; Sensorless speed control; Sliding mode control; Speed and torque observers

KeyWords Plus: DC Motor; Position control; Drives; Design

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Publisher: Korean Inst Power Electronics

Publisher Address: RM 408, Korea Science & Technology BLDG, 635-4, Yeoksam-Dong, Kangnam-Gu, Seoul, 135-703, South Korea

ISSN: 1598-2092

Citation: Guerreiro, M. G.; Foito, D.; Cordeiro, A. - A Sensorless PMDC Motor Speed Controller with a Logical Overcurrent Protection. Journal of Power Electronics. ISSN 98-2092. Vol. 13, nr 3 (2013), p. 381-389.