DSP Based Brushless Permanent Magnet Motor Controller Design Using Modified Variable Structure Control Theory

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ABSTRACT

A Digital Signal Processor (DSP) based brushless Permanent Magnet (PM) motor control doing the theory analysis and experimental in this dissertation. Using the new modified variable structure control theory, the experiment result shown that the new output controller is feasible on the control of brushless PM motor. The Linear Matrix Inequality (LMI) method which is applied for dynamic output feedback for mismatched uncertain Variable Structure System (VSS). Using this new LMI theory based output feedback Variable Structure Control (VSC), the mismatched variable structure systems is asymptotically stable with good performance. In addition, Because of the large-scale systems control problem are asymptotically important. We discuss the solved method with the stabilization and chatting problem of large-scale systems with mismatched uncertain. In the subsystem, a fictitious control is presented to prove the stability. In order to improve the chatting problem, we use a continuous sliding mode controller to deal with the chatting problem. We propose new decentralized variable structure controller which guarantees the stability without chattering problem.

Keywords : Digital signal processor (DSP), Brushless permanent magnet (PM) motor , Variable structure systems(VSS), Linear matrix inequality (LMI), Sliding mode, Chattering problem

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