Design of a robust adaptive CMAC system for BLDC motors with PI type parameter adaptation

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Abstract

The main advantage of cerebellar model articulation controller (CMAC) is its fast learning rate compared to other neural networks since it can provide more potential to enrich the mapping relationship between inputs and outputs. This paper proposes a robust adaptive CMAC system for brushless DC motors with PI type parameter adaptation. CMAC is used to mimic an ideal controller based on the Lyapunov stability theory, and the robust controller is designed to achieve tracking performance with desired attenuation level. The robust adaptive CMAC system is implemented on a field programmable gate array chip and is applied to brushless DC (BLDC) motor control. Some experimental results verify that the proposed robust adaptive CMAC method can achieve good parameter adaptation and favorable tracking performance.

Keyword：Adaptive control; robust control; CMAC; BLDC motor; field programmable gate array