Design of intelligent power controller for DC-DC converters using CMAC neural network

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Abstract

DC-DC converters are the devices which can convert a certain electrical voltage to another level of electrical voltage. They are very popular used because of the high efficiency and small size. This paper proposes an intelligent power controller for the DC-DC converters via cerebella model articulation controller (CMAC) neural network approach. The proposed intelligent power controller is composed of a CMAC neural controller and a robust controller. The CMAC neural controller uses a CMAC neural network to online mimic an ideal controller, and the robust controller is designed to achieve tracking performance with desired attenuation level. Finally, a comparison among a PI control, adaptive neural control and the proposed intelligent power control is made. The experimental results are provided to demonstrate the proposed intelligent power controller can cope with the input voltage and load resistance variations to ensure the stability while providing fast transient response and simple computation.

Keyword：adaptive control; robust control; CMAC neural network; DC-DC converter