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A DC/DC Buck Converter Voltage Regulation UsingAn Adaptive Fuzzy Fast Terminal Synergetic Control

Noureddine Hamouda, Badreddine BABES, Mohamed MEZAACHE

Abstract : In this paper, an adaptive fuzzy fast terminalsynergetic voltage regulation for DC/DC buck converter isdesigned based on recently developed synergetic theory and aterminal attractor method. The advantages of presentedsynergetic control include the characteristics of finite timeconvergence, insensitive to parameters variation and chatteringfree phenomena. Rendering the design more robust, fuzzy logicsystems are used to approximate the unknown parameters in theproposed controller without calling upon usual modellinearization and simplifications. Taking the DC/DC buckconverter in continuous conduction mode as an example, thealgorithm of proposed synergetic control is analyzed in detail. Allthe simulation results demonstrate the effectiveness and the highdynamic capability of the proposed AF-FTSC control techniqueover the FTSC strategy

Keywords : synergetic control, fuzzy logic system, terminal technique, finite time convergence, DC/DC buck converter