

A Robust Adaptive Fuzzy Fast Terminal Synergetic Voltage Control Scheme for DC/DC Buck Converter

B. Babes, A. Boutaghnae, N. Hamouda, M. MEZAACHE, S. Kahla

Abstract : In this paper, an adaptive fuzzy fast terminal synergetic voltage control scheme for DC/DC buck converter is proposed based on recently developed synergetic theory and a terminal attractor method. The advantages of presented synergetic control include the characteristics of finite time convergence, insensitive to parameters variation and chattering free phenomena. Rendering the design more robust, fuzzy logic systems are used to approximate the unknown parameters in the proposed controller without calling upon usual model linearization and simplifications. Taking the DC/DC buck converter in continuous conduction mode as an example, the algorithm of proposed synergetic control is analyzed in detail. All the simulation results demonstrate the effectiveness and the high dynamic capability of the proposed AF-FTSC control technique over the FTSC strategy.

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