

298. DESIGN AND IMPLEMENTATION OF FRACTIONAL ORDER PID CONTROLLER FOR DUAL-BUCK HALF-BRIDGE CIRCUIT

V. Prakashbabu(PG student)¹, Dr. M. Arounassalame(Associate professor)²

Department of Electrical and Electronic Engineering

Pondicherry Engineering College, Puducherry

¹v.prakash8288@gmail.com , ²arun@pec.edu

Abstract—Gradual depletion of conventional energy sources and increasing energy demand has resulted in growth of power generation from renewable resources. Micro dc grid is an innovative technology in dc power distribution system, which primarily depends on the power generation of renewable energy resources. In spite of that, the mode of power transmission in a micro dc grid is normally two wire transmission which may not satisfy the voltage requirements of many power converters and loads. To satisfy such conditions, a half bridge voltage balancer was used in micro dc grid, which transforms a two wire into three wire transmission line i.e. by building a neutral line. But the existence of shoot through/ inrush current between converter switching devices reduces the reliability/fidelity of this voltage balancer. To overcome this, a special dual buck half bridge voltage balancer and a new control scheme were introduced. In this paper, a new fractional order PID controller using genetic algorithm tuning method is proposed. The control parameters are obtained by deriving the small signal model of voltage balancer and especially the current relationships of inductor, capacitor and unbalanced loads are analyzed. At last simulation results for various loads obtained in MATLAB coupled with POWERSIM using simcoupler are discussed.

Key words: Micro-dc grid, buck converter, dc distribution system, grid-connected inverter, voltage balancer.

Journal of Science and Innovative Engineering & Technology