

DYNAMIC LOAD EMULATORS BASED ON FUZZY AND SLIDING MODE CONTROL OF SVM-DTC

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Abstract

This paper presents emulation of dynamic load using Direct Torque Control (DTC) based induction machine drive. The main objective of this emulator is to provide test facility for 3-phase AC servo drives which are increasingly becoming popular since last few decades. It is shown that, induction machine can emulate linear as well as nonlinear loads, when controlled with modern DTC. Space Vector Modulation (SVM) with adaptive- PI controller is employed for direct torque control instead of fixed gain PI controllers, to provide required dynamic performance as a dynamometer. Fuzzy Inference System (FIS) is used to tune the PI controller to satisfy the needs of the application. Also, Sliding Mode Control (SMC) is employed along with SVM to realize the control required. Thus, two separate algorithms are proposed for emulation of any load pattern. The systems are simulated and simulation results are presented in this paper.

Keywords: Load emulation, Dynamometer, Fuzzy inference system, Sliding mode control.