ABSTRACT

The thesis deals with the design, implementation and testing of a position control system for a vector controlled cage induction motor. The proposed thesis consists of two major parts; first to build a platform for position and speed control and second, to study the effect of sampling time, switching frequency and output quantization step on the position performance and inverter efficiency of the system.

The platform (both hardware and software) for position and speed control of the cage induction motor is built using the principle of vector control. The proposed system is implemented using TMS320F241 DSP from Texas Instruments. The vector control algorithm is written in C language. Power module, an "ASIPM PS-12015-A", 1.5 kW, 3-phase IGBT inverter from Mitsubishi is used for hardware implementation. Incremental encoder model "TRD-S1024B", 1024 pulses per revolution, is used to feed back the position and speed to the control loop. P and PI controllers are employed to provide the closed loop control for position and speed regulation, respectively.

It was found that the effect of sampling time on the position performance and inverter efficiency is not significant for the tested sampling frequencies. The switching frequency does not affect much the position performance for the tested conditions, but directly affects the inverter efficiency. The variation of quantization step affects the position performance but not the inverter efficiency.