ABSTRACT

The thesis deals with the performance analysis and implementation of a power factor correction converter fed vector controlled induction motor drive. The proposed system is divided into two major parts: power factor correction converter and vector controlled induction motor drive. The control scheme of the power factor correction converter is based on the principle of an active current wave shaping technique. A single-phase boost converter within the power factor correction converter improves the power quality of ac mains in terms of unity power factor and sinusoidal input current waveform and provides a constant dc voltage for feeding to the inverter of the vector controlled induction motor drive even under supply voltage fluctuations. For the vector controlled induction motor drive, the control scheme is based on field orientation control. It offers a high level of dynamic performance to control the three-phase cage motor drive to behave like a fully compensated separately excited dc motor. In the closed loop control of the vector controlled induction motor drive two PI controllers are employed to provide precise speed regulation at a given reference speed under load torque perturbation on the motor shaft. The PFC converter fed vector controlled induction motor drive has been simulated using a C program. The digital signal processor (DSP) of Texas Instrument (TMS320F240) is used for implementing the proposed system. The simulated results have been observed to match with that of the experimental results, thus confirming the effectiveness of models and algorithm developed in this work.