ABSTRACT

Increase of power transfer capability of transmission system leading to economic and efficient use of right-of-way is a problem faced by developed countries. High phase order system or multiphase transmission system with compact line design or conversion of existing double circuit three phase line into a Six Phase line helps in overcoming this problem.

The advancement in high power, high speed power semiconductor device technology have facilitated efficient implementation of advanced control techniques in Multi phase induction motor drive applications. Reduction in Harmonic losses is one of the prime requirements in high power drive applications. Multilevel inverters and inverter fed multi phase motors are very promising in this respect.

The six phase Induction Motor can be started and run with some phases open and performance in this faulted mode can be as good as with all phases energized. Six phase motors have extensively been suggested for high power industrial drives. The important motivations behind the study of multi level inverter fed six phase induction motors are improved system reliability, reducing harmonics of dc link current, lowering harmonic current losses for rotor, reduced harmonic power loss, reduced torque ripples when compared to that of the three phase counterpart. In light of this fact this thesis presents a modular MATLAB/ Simulink implementation of six phase Induction motor
model controlled by Space- vector PWM scheme using different multi level inverter systems with a comparative study. The Six-phase induction motors are achieved by splitting the stator windings of three phase induction motor into two identical halves, which has a phase displacement of 30 electrical degrees between them.

In the literature, the analysis of Six phase induction motor with SVPWM only for 2-level inverter has been presented. In this thesis, an attempt is made to evaluate the performance of Six Phase Induction Motor with various Multi level inverters such as dual-3, dual-4, dual-5, dual-6 and dual 7-level inverters independently using SVPWM technique for dynamic load torque.

The simulation results obtained in this thesis were satisfactory and comparable in different SVPWM level inverters. The Total Harmonic Distortion (THD) reduction for six phases Induction motor drives with various Multi level inverters are also studied in this thesis.

This thesis deals with Decomposed SVPWM multi level inverter algorithm to analyze the six phase Induction motor. This technique simplifies the space-vector figure (diagram) of each dual multi-level inverter into different space-vector figures of dual 2-level SVPWM inverters. Subsequently the left over essential procedures for the dual 2-level SVPWM inverters are done like conventional dual 2-level inverter and execution time is significantly reduced.

All the investigations reported in this thesis are simulated comprehensively in MATLAB platform using SIMULINK toolbox.