CHAPTER 7

CONCLUSION AND FUTURE SCOPE OF WORK

The thesis is focused on investigation and development of Cuk and buck-boost converter topology in drive topology modification for ride-through of voltage sag and swell.

7.1 CONCLUSION

In this thesis, the simulation models of Cuk and buck-boost converter are developed to mitigate voltage sag and swell. Then, experimental model of Cuk converter is developed.

The ASDs are the sophisticated electronic equipment which are used by domestic and industries customers for energy saving and process control. But, these are very sensitive to power quality problems. In PQ problems, voltage sag occurs more common and it affects the process outages. Voltage swell occurs less frequently, but minor swell can damage the equipment. There are seven types of voltage sag which are type A, type B, type C, type D, type E, type F and type G and three types of voltage swell such as instantaneous swell, momentary swell and temporary swell. They lead to lot of technical and financial consequences in the industries. By maintaining the constant DC-bus voltage of ASD, the operation of the IM drive goes smoothly. To maintain constant DC-link voltage during sag and swell conditions, various ride-through schemes are suggested. In drive topology modification, modification is only done in drive circuit and also hardware required is
minimum. Hence, to mitigate both the voltage sag and swell, the Cuk and buck-boost converters are provided.

The IM performance is analyzed with 50% and 60% sag depths and 25% and 30% swell conditions for all the seven types of voltage sag and instantaneous voltage swell. From the analysis, it is concluded that in the worst case (type A sag), during the 60% sag condition, the motor speed comes down up to 1150 rpm. The DC-link voltage is maintained as constant quantity, when Cuk or buck-boost converter is provided for ride-through against power quality problems. Hence, the IM performance does not get affected. The simulation results are validated using hardware experimental setup.

7.2 FUTURE SCOPE

Recent development of ride-through methods provides the solution for mitigating voltage sag and swell. The ride-through topology can be developed in an economical manner. The extension of this thesis work can be developed based on intelligent controllers for converters. In future, a global approach to mitigate sag, swell, harmonics and transients can be developed.