CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 CONCLUSION

Two bus system with UPFC is modeled and simulated using the blocks of MATLAB/SIMULINK. The real power is measured at various angle of injected voltage. The reactive power is investigated with the magnitude of injected voltage. It is observed that the real power increases with the increase in the angle of injection and the reactive power increases with the increase in the magnitude of shunt voltage. A new circuit model is developed for 14 bus system with and without UPFC. The model of UPFC consists of only one shunt current source and one series voltage source. The simulation is done successfully with the models developed. It is observed that the real power, reactive power and voltages are improved in the buses nearer the UPFC system. The harmonics in the output are reduced by replacing the H bridge voltage source inverter with multilevel inverter. The quality of the injected voltage is successfully improved by applying PWM and SVM technique. The THD is found to be minimum in the case of MLI based UPFC system.

The IEEE 30 bus system is modeled and simulated with and without UPFC. Voltage sag is compensated using the UPFC system. The performance of UPFC in mitigating voltage sag is demonstrated with the help of MATLAB/SIMULINK. The UPFC injects appropriate voltage to keep the load voltage constant. In case of voltage sag, which is a condition of
temporary reduction of the supply, the UPFC injects a positive voltage. It is observed that the real and reactive powers increase by the addition of the UPFC system. The voltage at the buses nearer to the UPFC increases. Variation of reactive power with the variation in the injected voltage is presented. Voltage quality is improved by using voltage source injection. The simulation results of 14 and 30 bus systems are in line with the predictions. The results show that the control technique is a simple method to compensate the voltage sag. Voltage stability is improved by using UPFC with multiple DVR system instead of conventional UPFC system.

The contributions of the present work are as follows:

- Reduction in harmonics by using PWM inverter type UPFC
- Reduction in harmonics by using SVM inverter type UPFC
- Reduction in harmonics by using MLI type UPFC
- Improvement in voltage quality by using new multiple DVR type UPFC

7.2 FUTURE SCOPE AND LIMITATIONS OF THE RESEARCH

This work deals with modeling and simulation of 30 bus system using MATLAB simulink.

- The simulation can also be done using PSCAD and PSIM.

- This work has covered power quality in 30 bus system using UPFC. The work may be extended to sixty four bus system.

- Hardware implementation is beyond the scope of this work. Laboratory model for the hardware may be implemented using Digital Signal Processor (DSP).
• Multibus system with multiple FACTS controllers may be studied to observe the power quality improvement.

• Closed loop system using Neural network or genetic algorithm can be studied in future.