CHAPTER 7

CONCLUSION

7.1 FINDINGS

The Power Quality Conditioner combining TCR with shunt hybrid filter has been designed for both balanced and unbalanced single phase and three phase loads and it is highly economical. The designed power quality conditioner is found suitable for reduction in harmonic content and reactive power with lesser cost which, in turn, reduces the penalty that is being imposed by the utilities. It also helps to conserve electrical energy and reduces the tariff.

Through the Hardware setup and simulation on the case studies, the following conclusions are derived.

- For prototype case study the power factor is improved from 0.65 for without conditioner to 0.95 for with proposed conditioner (UEHPQC). THD is reduced from 22.1% for without conditioner to 5.2% for with proposed conditioner. Active filter size is reduced from 36.08 VA to 6.56 VA when connected with passive filter and TCR. The settling time and THD reduces when proposed conditioner is used with ANN controller compared to PI controller.

- For railway traction load case study the power factor is improved from 0.71 for without conditioner to 0.97 for with proposed conditioner. THD is reduced from 15.31% for without conditioner to 7.11% for
with proposed conditioner. Active filter size is reduced from 294.4 kVA to 85.8 kVA when connected with passive filter with TCR. The settling time and THD reduces when proposed conditioner is used with ANN controller compared to PI controller.

- For hotel load case study the power factor is improved from 0.78 for without conditioner to 0.99 for with proposed conditioner. THD is reduced from 30.66% for without conditioner to 3.77% for with proposed conditioner. Active filter size is reduced from 256.56 VA to 59.2 VA when connected with passive filter and TCR. The settling time and THD reduces when proposed conditioner is used with ANN controller compared to PI controller.

Hence, the proposed Power Quality Conditioner combining TCR with shunt hybrid filter which has been designed for both balanced and unbalanced single phase and three phase loads is highly economical. The designed power quality conditioner is found suitable for reduction in harmonic content and reactive power at a low cost which, in turn, reduces the penalty that is being imposed by the utilities. It also helps in conserving electrical energy and reduces the tariff.

7.2 FUTURE SCOPE

This research work can be extended by considering the following points.

(i) The proposed system can be extended for voltage sag and interruptions.

(ii) This can be extended for the renewable energy plants.

(iii) Environmental conditions can be studied and modified accordingly.