CHAPTER 6

CONCLUSIONS AND SCOPE FOR FURTHER STUDY

6.1 Conclusions

The focus of this research has been to achieve voltage stability in a DC-DC converter. To this end various steps were taken. A new converter has been designed splitting input side capacitor thus enabling enhancement of output voltage. To check the stability of the new converter, Bode plot and RH criterion were used. To cross verify the stability of the new converter, Transfer function with signal flow graph was used. To change a converter from non-linear behaviour to linear behaviour for stability purposes, various controllers PI, FLC, ANN and ANN with SMC were employed in the new converter.

Simulation exercises were conducted for all controllers in terms of peak overshoot, voltage ripple and settling time and the results for each controller have been compared with those of others, and the best controller was identified.

The PI controller based SEPOSCLC produces better performance in voltage control and voltage ripple. But the drawback is high overshoot. FLC improves the performance of SEPOSLC compare to PI in the aspect of overshoot and settling time of voltage. But the problem is it results increased voltage ripple. ANN based SEPOSLC reduces voltage ripple and settling time of voltage compare to PI and FLC. Even though ANN eliminates the overshoot the voltage ripple is yet to be reduced. Proposed ANN with SMC produces better performance in all aspects compare to all other controllers. In this Proposed ANN with SMC controlled SEPOSLC no drawbacks in the aspect of Peak overshoot, voltage ripple and settling time.
This was used as part of hardware prototype model to prove that output voltage is steady and the speed of BLDC motor is maintained constant with various input voltage.

The newly-designed converter in this research provides high voltage transfer gain and steady output voltage, high stability, least ripple.

6.2 Scope for Further Study

In this study performance of proposed SEPOSLC is controlled using ANN-SMC controller and validated with experimental analysis using variable input voltage. In future the application of this system may be extended to renewable energy. SEPOSLC fed from renewable energy with BLDC motor load maybe applied to various applications such as water pumping, cordless tools and electric vehicles.