From the results obtained, it can be comprehended that both the ANN-based algorithms used as control techniques are more efficient than the conventional controller. Both algorithms are having good perfection, while the LM algorithm gives a more accurate and stable convergence.

VI. Conclusion

The performance evaluation of the three different control techniques employed in the SEIG-ELC system has been done. The results achieved infer that the ANN controllers are very much suitable to be used in ELCs. Thereby these technologies can be productively applied in SEIG-ELC systems for supplying a regulated voltage and hence a regulated power at varying consumer loads.

Appendix

The parameters of the considered machine are as follows:

3-phase, delta connected, 2.2KW, 230V, 7.78A, 4 pole, 50 Hz, X_{ls}=0.00442 kΩ, X_{lr} = 0.00442 kΩ, R_s = 0.00288k Ω, R_r = 0.00288 kΩ, C = 50μF.

The relation between the magnetizing inductance (L_m) and the magnetizing current (I_m)of the machine is expressed as:

$$L_m = 0.3177 \quad \text{for } I_m \leq 0.75$$
$$= 0.3502 - 0.0349\, I_m - 0.0017 I_m^2 \quad \text{for } 0.75 < I_m \leq 4.25$$
$$= 0.17667 \quad \text{for } I_m > 4.25$$

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