CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 CONCLUSION

The RLC series and parallel resonance experiments demonstrated key differences in circ uit behavior at resonance. In the series RLC circuit, resonance occurred when the inductiv e and capacitive reactance canceled each other ($X_L = X_C$), resulting in minimum impedance (Z=R) and maximum current. The voltage across the inductor and capacitor magnified d ue to the quality factor (Q), while the phase angle between voltage and current became ze ro, indicating unity power factor. In contrast, the parallel RLC circuit exhibited maximum i mpedance and minimum current at resonance, with circulating currents between LL and CC. These experiments highlighted practical applications such as tuning circuits (series) and tank circuits (parallel).

The power factor experiment emphasized the importance of improving efficiency in AC ci rcuits. Inductive loads caused a lagging power factor, increasing reactive power and redu cing system efficiency. By introducing a compensating capacitor, the power factor was c orrected toward unity, minimizing losses and optimizing power delivery. Together, these e xperiments illustrated fundamental AC circuit principles—resonance conditions, impedan ce effects, and power factor correction—essential for designing efficient electrical system s in real-world applications.

5.1 RECOMMENDATION

To enhance future RLC trainer the following recommendations should be implemented. First, u sing precision instruments like digital LCR meters and calibrated oscilloscopes will improve measure ment accuracy for component values and phase relationships. For resonance experiments, taking fin er frequency steps near resonant peaks will allow more precise determination of quality factor (Q) and bandwidth, while in power factor studies, employing variable capacitor banks would better demonstrate compensation effects. Safety measures like current-limiting resistors and isolation transformers should be incorporated when working with high-Q circuits to prevent equipment damage. These improvements would lead to more reliable data, deeper understanding of AC circuit principles, and safer laboratory practices, ultimately enhancing the educational value of the experiments. For more advanced studies, investigating different load types and their compensation requirements could provide valuable insights into real-world power system applications.

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