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**Report Sheet for Experiment 9: Faraday’s Law of Induction**

Abstract

In this experiment,

Introduction and Theoretical Background

According to the Faraday’s law, one of 4 Maxwell’s equation, when the magnetic flux is changed overtime, electromotive force is induced in the closed circuit. he electromotive force can be induced by acquiring the magnetic field from the source that produce time-dependent magnetic field. In this experiment, AC current is parsed through the first coil. This time-dependent magnetic field will transmit to the second coil above the first one.

According to the Faraday’s law,

…(1)

Magnetic flux can be calculated by,

… (2)

From Bio-Savart’s law.

  … (3)

From equation (2) and (3), Magnetic flux can be simply derived as

  … (4)

From (1) and (4), therefore,

… (5)

Since the applied voltage is not constant, assume that V(t) = V0cos(2πft)

Therefore,

… (6)

Methods

1. Set the equipment as shown in the figure 1.

Diagram

Description automatically generated

**Figure 1.** Set up of the equipment [1]

1. Use 2000 turn coil to detect the emf
2. Adjust the triangle wave’s frequency to be 1 kHz
3. Start recording the signal from the generator coil and detector coil
4. Measure the amplitude and period of the source and induced voltage
5. Repeat 2-4 again but change the frequency to be 1.5, 2, 2.5, 3 kHz respectively.
6. Repeat 2-4 again but change the wave type to sinusoidal and square wave
7. Use 400 turn coil to detect the emf and adjust the triangle wave’s frequency to be 2 kHz
8. Start recording the signal from the generator coil and detector coil
9. Measure the amplitude and period of the source and induced voltage
10. Repeat 8-10 again but change the frequency to be 2.5, 3, 3.5, 4 kHz respectively.

Results

Ksn;vopsfj;jslslnslnsdvj

Discussion

In the first part of RL circuit, the phase difference between the voltage of the resistor and that of the

Conclusion

In conclusion

Reference

1. Lab manual titled “**Ch9. Faraday’s law of induction”**from Department of Physics on KLMS