

## Euler's Coil Technology Experiment 2

**Aim:** To Distinguish between two hypothesis.

Hypothesis A:

Transformer is a device that transferring electrical energy from Primary Coil to Secondary Coil. For an ideal transformer:

<p style="font-size: small;">From Faraday's Law</p> $\frac{V_S}{V_P} = \frac{N_S}{N_P}$	<p style="font-size: small;">For ideal transformer</p> <p style="font-size: x-small;">The voltage ratio is equal to the turns ratio, and power in equals power out.</p>	<p style="font-size: small;">From conservation of energy</p> $P_P = V_P I_P = V_S I_S = P_S$
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Hypothesis B:

First Round Induction from Primary coil to Secondary coil:

$$V(\text{Primary coil}) = \sin(t)$$

$$V(\text{Induced Secondary coil}) = -V'(\text{Primary coil}) = -(\sin(t))' = -\cos(t)$$

Notice that  $\sin(t - \pi/2) = -\cos(t)$

Hypothetical Induction from Secondary coil to Primary coil:

$$V(\text{Induced Primary coil}) = -V'(\text{Induced Secondary coil}) = -(-\cos(t))' = -\sin(t)$$

Notice that  $\sin(t - \pi) = -\sin(t)$

The description of the energy transferring process should be

$$E(\text{Original Primary coil}) \rightarrow E(\text{Induced Secondary coil})$$

$$E(\text{Induced Secondary coil}) \rightarrow E(\text{Induced Primary coil})$$

$$E(\text{Induced Primary coil}) = -E(\text{Original Primary coil})$$

$$E(\text{Final Primary coil}) = E(\text{Induced Primary coil}) + E(\text{Primary coil})$$

$$E(\text{Final Primary coil}) = E(\text{Primary coil}) + (-E(\text{Primary coil}))$$

$$E(\text{Final Primary coil}) = E(\text{Primary coil}) - E(\text{Primary coil})$$

$$E(\text{Final Primary coil}) = 0$$

Thus:

$$V(\text{Primary coil}) = V(\text{Primary coil}) + V(\text{Induced Primary coil})$$

$$V(\text{Primary coil}) = \sin(t) + (-\sin(t))$$

$$V(\text{Primary coil}) = \sin(t) - \sin(t)$$

$$V(\text{Primary coil}) = 0$$

$$V(\text{Induced Secondary coil}) = -\cos(t)$$

Generically speaking:

Given initially when  $V(\text{Primary coil}) = A(t)$  and  $V(\text{Secondary coil}) = B(t)$ ,

What we have at its steady state,

$$V(\text{Primary coil}) = A(t) - \frac{n}{1} B(t) + \frac{n}{2} A'(t) - \frac{n}{3} B''(t) + \frac{n}{4} A'''(t) - \frac{n}{5} B''''(t) \dots$$

$$V(\text{Secondary Coil}) = B(t) - \frac{n}{1} A(t) + \frac{n}{2} B'(t) - \frac{n}{3} A''(t) + \frac{n}{4} B'''(t) - \frac{n}{5} A''''(t) \dots$$

Original Energy content of each coil:

$$E(\text{Primary Coil}) = \int A(t) dt$$

$$E(\text{Secondary Coil}) = \int B(t) dt$$

Final Energy content of each coil (if undisrupted):

$$E(\text{Primary Coil}) = \int (A(t) - \frac{n}{1} B(t) + \frac{n}{2} A'(t) - \frac{n}{3} B''(t) + \frac{n}{4} A'''(t) \dots) dt$$

$$E(\text{Secondary Coil}) = \int (B(t) - \frac{n}{1} A(t) + \frac{n}{2} B'(t) - \frac{n}{3} A''(t) + \frac{n}{4} B'''(t) \dots) dt$$

Of course. Since:

$$E(O. \text{Primary Coil}) + E(O. \text{Secondary Coil}) = \int A(t) dt + \int B(t) dt$$

$$E(f \text{ Primary Coil}) + E(f \text{ Secondary Coil}) = \int (A(t) - \frac{n}{1} B(t) + \dots) dt + \int (B(t) - \frac{n}{1} A(t) \dots) dt$$

Therefore, obviously

$$E(O \text{ Primary Coil}) + E(O \text{ Secondary Coil}) \neq E(f \text{ Primary Coil}) + E(f \text{ Secondary Coil})$$

On the other end, in the normal transforming process,

Given initially when  $V(\text{Primary coil}) = A(t)$  and  $V(\text{Secondary coil}) = 0$

Its steady state could be given by substituting  $B(t) = -A'(t)$ ,

### Setup:

This experiment is divided into two groups in terms of A.C power supply: transitory (T) and persistent (P), the former will have only transitory and periodic A.C power supply while later have A.C power supplied uninterrupted.

The control (C) is an A.C source connected to a 'normal' Transformer with 1:1 Primary to Secondary ratio.

The comparison circuit 1 is an A.C source connected to a modified Transformer which we have one Source coil in the middle of two Response coils.

Yet another comparison circuit 2 is an A.C source connected to a modified Transformer which we have one Source coil at the center of radius of a circle formed three Response coils.

Notice all Source and Response coil setup are separated by the identical distance.

### Expected Result:

If Hypothesis A is right, then we would expect the voltage variation would only happen when its energy is supplied by an A.C source, therefore we should only observe periodic voltage variation in group T when A.C power is on. The period is controlled by the supply frequency  $f$ . We should expect the amplitude of voltage variation in the descending order of C, 1, 2 for both groups since there are more Response coils to share the electrical energy coming a single source of power.

If Hypothesis B is right, then we would expect little difference between group P and T since the later give spaces for the infinite recursive interaction to generate enough electrical energy to sustain the system. Particularly, the outputting voltage would increase as the number of Response coils increase. Thus the amplitude of outputting voltage variation would be in ascending order of C,1,2 in both group. Moreover, since T group is generating more electrical energy than P group, the effect should be stronger in T group than P group. We expect  $T_C=TP, T_1>P_1, T_2>P_2$ .

### **Result:**

### **Discussion:**

Setup P and T is use to verify the experimental hypothesis that the infinite recursive interaction do happen therefore we could replace persistent voltage supply with transitory voltage supply without affecting the function of the system(implying 'extra' energy induce in the process). The purpose of having more Response coil in 1 and 2 is to demonstrate convincingly that the electrical energy is coming from the Response coil but NOT from the Source coil, thus the total amount of electrical energy increase as the number of Response coil increase. That is the basic principle of Euler' s Gil technology.