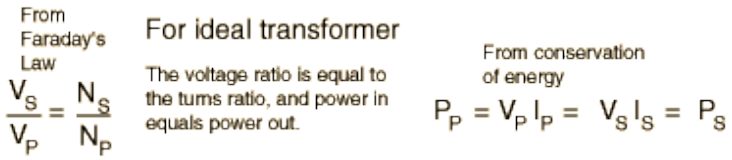
Euler's Coil Technology Experiment 3

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:



Specifically, the arrangement of Source coil and Response coil does NOT affect the output of transformer.

Hypothesis B:

First Round Induction from Primary coil to Secondary coil:
$V(Primary\,coil)=\sin(t)$
$V(Induced\,Secondary\,coil)=-V'(Primary\,coil)=-(\sin(t))'=-\cos(t)$
Notice that $\sin(t-Pi/2)=-\cos(t)$

Hypothetical Induction from Secondary coil to Primary coil:
$V(Induced\,Primary\,coil)=-V'(Induced\,Secondary\,coil)=-(-\cos(t))'=-\sin(t)$
Notice that $\sin(t-Pi)=-\sin(t)$

The description of the energy transferring process should be
$E(Original\,Primary\,coil)\rightarrow E(Induced\,Secondary\,coil)$
$E(Induced\,Secondary\,coil)\rightarrow E(Induced\,Primary\,coil)$
$E(Induced\,Primary\,coil)=-E(Original\,Primary\,coil)$
$E(Final\,Primary\,coil)=E(Induced\,Primary\,coil)+E(Primary\,coil)$
$E(Final\,Primary\,coil)=E(Primary\,coil)+(-P(Primary\,coil))$
$E(Final\,Primary\,coil)=E(Primary\,coil)-E(Primary\,coil)$
$E(Final\,Primary\,coil)=0$

Thus:
$V(Primary\,coil)=V(Primary\,coil)+V(Induced\,Primary\,coil)$
$V(Primary\,coil)=\sin(t)+(-\sin(t))$
$V(Primary\,coil)=\sin(t)-\sin(t)$
$V(Primary\,coil)=0$
$V(Induced\,Secondary\,coil)=-\cos(t)$

Generically speaking:
Given initially when V(Primary coil)=A(t) and V(Secondary coil)=B(t),
What we have at its steady state,

$$V(Primary\,coil)=A(t)-\underset{1}{n}B(t)+\underset{2}{n}A'(t)-\underset{3}{n}B''(t)+\underset{4}{n}A'''(t)-\underset{5}{n}B''''(t).....$$

$$V(Seconady\,Coil)=B(t)-\underset{1}{n}A(t)+\underset{2}{n}B'(t)-\underset{3}{n}A''(t)+\underset{4}{n}B'''(t)-\underset{5}{n}A''''(t).....$$

Original Energy content of each coil:

$$E(Primary\,Coil)=\int A(t)\,dt$$

$$E(Secondary\,Coil)=\int B(t)\,dt$$

Final Energy content of each coil(if undisrupted):

$$E(Primary\,Coil)=\int (A(t)-\underset{1}{n}B(t)+\underset{2}{n}A'(t)-\underset{3}{n}B''(t)+\underset{4}{n}A'''(t).....)\,dt$$

$$E(Secondary\,Coil)=\int (B(t)-\underset{1}{n}A(t)+\underset{2}{n}B'(t)-\underset{3}{n}A''(t)+\underset{4}{n}B'''(t).....)\,dt$$

Of course. Since:

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

$$E(f\,Primary\,Coil)+E(f\,Secondary\,Coil)=\int (A(t)-\underset{1}{n}B(t)+....)\,dt+\int (B(t)-\underset{1}{n}A(t).....)\,dt$$

Therefore, obviously

$$E(O\,Primary\,Coil)+E(O\,Secondary\,Coil)\neq E(f\,Primary\,Coil)+E(f\,Secondary\,Coil)$$

On the other end, in the normal transforming process,
Given initially when V(Primary coil)=A(t) and V(Secondary coil)=0
Its steady state could be given by substituting B(t)=-A'(t) ,

Specifically, the arrangement of Source coil and Response coil does affect the output of transformer.

Setup:

This experiment is divide into two group 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 lying in the middle of two Response coils.
The comparison circuit 2 is an A.C source connected to a modified Transformer which we have one Source coil on the left of a Response coil, then we have another Response coils on the left of previous Response coil.
The comparison circuit 3 is an A.C source connected to a modified Transformer which we have one Source coil on the right of a Response coil, then we have another Response coils on the right of previous Response coil.

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 that the output of C, 1, 2 and 3 to be identical since arrangement of coil would not affect the output.
If Hypothesis B is right, then we would expect little difference between the output of group P and T since the later give spaces for the infinite recursive interaction to generate enough electrical energy to sustain the system. We should also expect that the output of 1,2 and 3 to be greater than C in either group. Moreover, that the output of 1 is identical to 3 but is different from 2 in either group.

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 Response coil in different arrangement in 1, 2 and 3 is to demonstrate that the infinite recursive interaction does occur, thus location would affect the outputting amplitude. The location effect is an important attribute of this hypothesis.