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# New Induction

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Supplement #2

Mobius Triangle Experiment

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## The Mobius Triangle Experiment

The Mobius triangle is discussed in detail in the paper "NEW INDUCTION.DOC", this supplement describes the construction and execution of the Mobius triangle experiment.

The following items are needed to run this experiment:

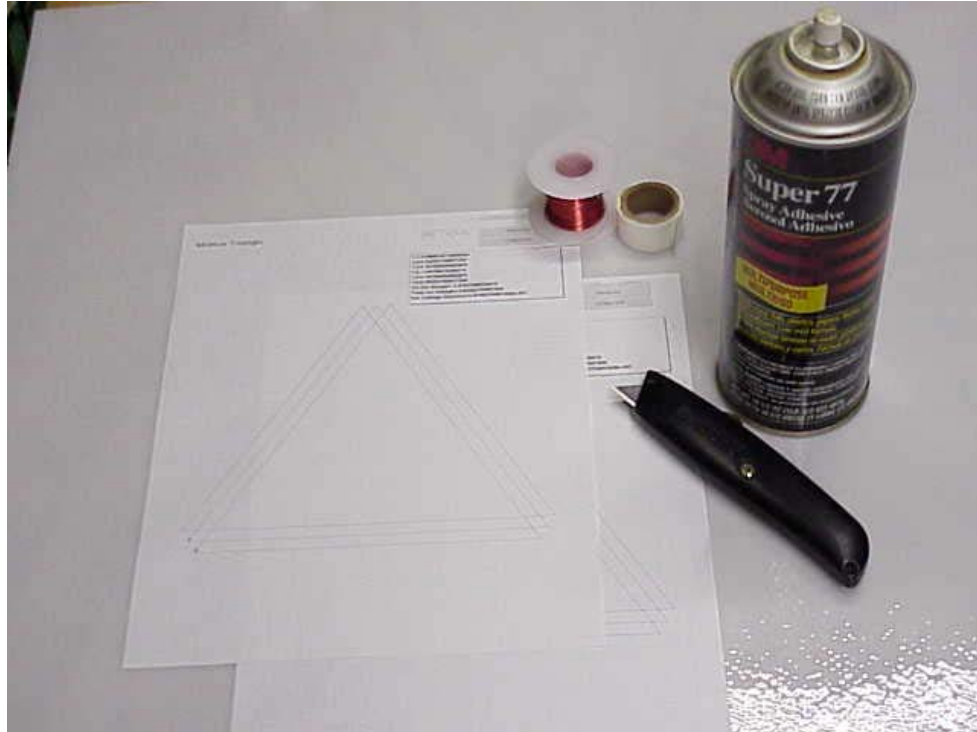
- 1) The software package "NEW\_IND.TBK" must be installed on your computer.
- 2) Spray adhesive.
- 3) 30awg magnet wire.
- 4) Masking tape.
- 5) Audio function generator.
- 6) DUAL trace oscilloscope with 2mv resolution and 20mhz bandwidth.
- 7) Two scope probes. One must be a x1 probe.

With these things the experiment is run as follows:

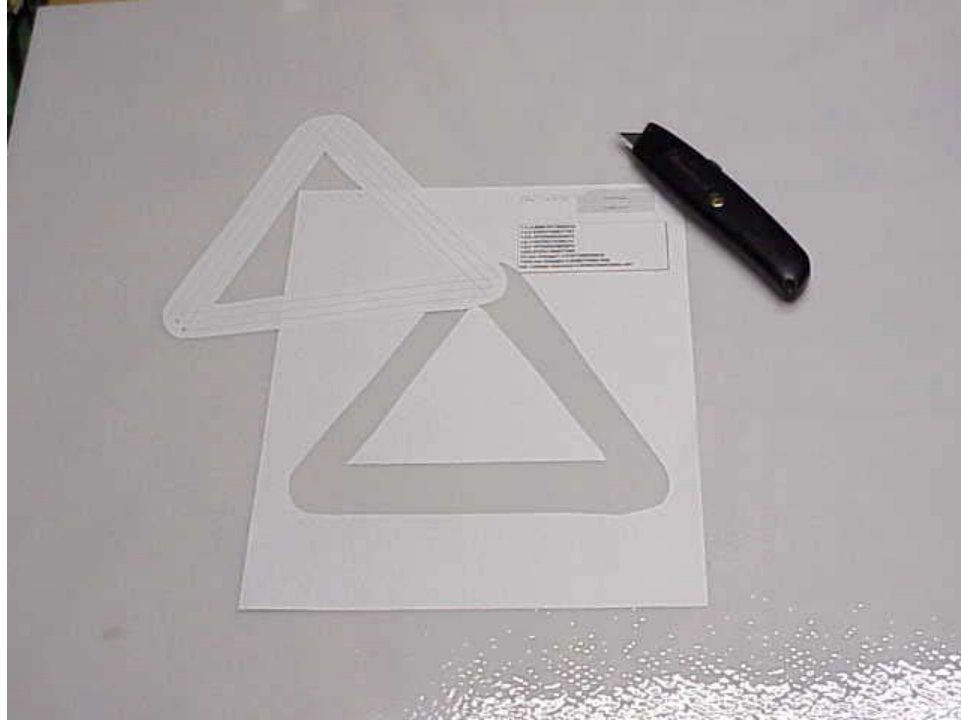
## Executing the experiment

- 1) Start the software package "NEW\_IND.TBK". If you agree to the terms, then click the "agree" button to reveal the buttons that allow you access into the various screens.
- 2) From the main screen, click the "Mobius Triangle" button.
- 3) In the upper right corner of the screen, the triangle dimensions are shown. The dimensions should already be set to 20i x 0.5i. These dimensions represent the dimensions of the Mobius strip that is folded into a triangle. The first dimension is the length and the second dimension is the width. The suffix "i" tells the screen to interpret this value in inches. If no suffix is supplied, then the length is interpreted in meters.
- 4) Once you have verified, the length, click the "redraw" button. This will redraw the triangle to the dimensions.
- 5) Then click the compute button. This may take a while (up to 1 to 7min). This algorithm computes the mutual inductance between the two triangles. This algorithm takes a while to process because it was written in a scripted language.

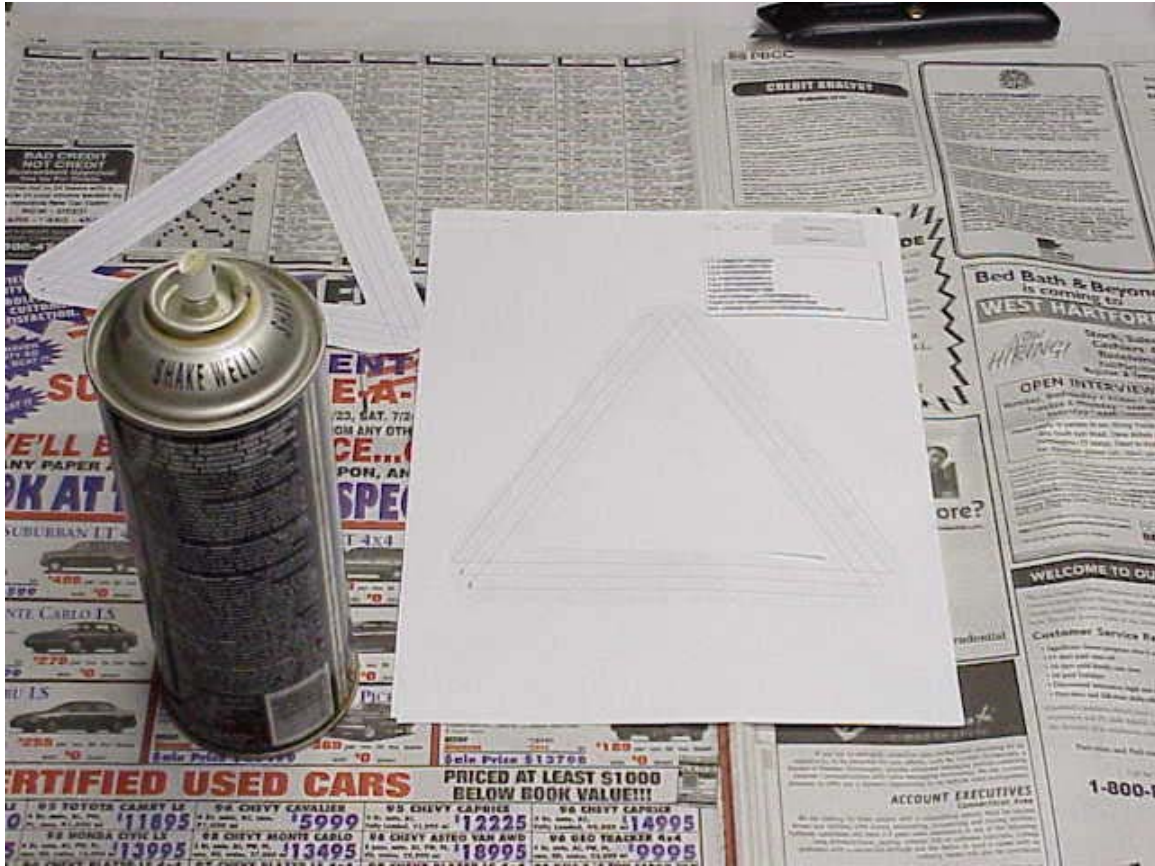
- 6) Once the processing is complete, click on file->print in the menu bar. When the print dialog opens, make sure it is set to "print this page only", then click the options button. In the options menu make sure "print actual size" is selected AND "print border" is not selected. Click ok, then click print.
- 7) You should print two copies of this template.
- 8) These are the items you need to construct the Mobius Triangle.



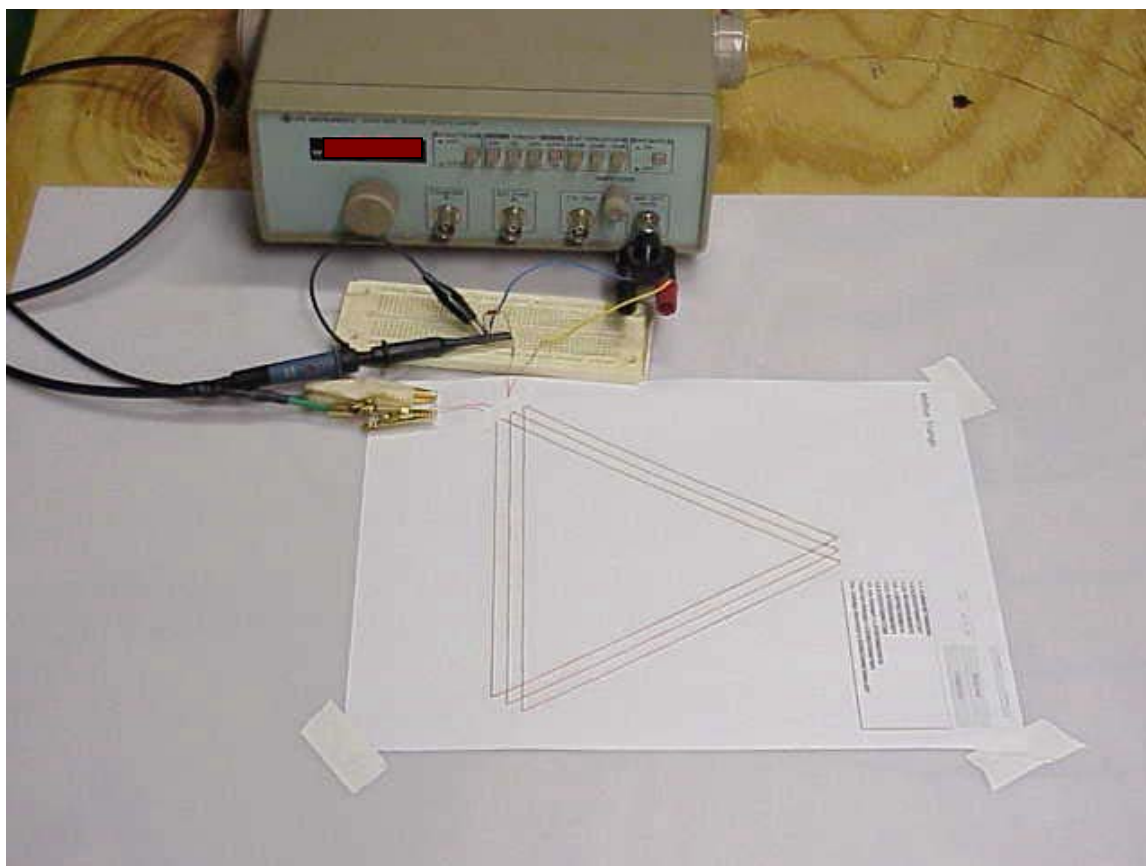
- 9) Use the knife to cut the triangles from one of the template copies.



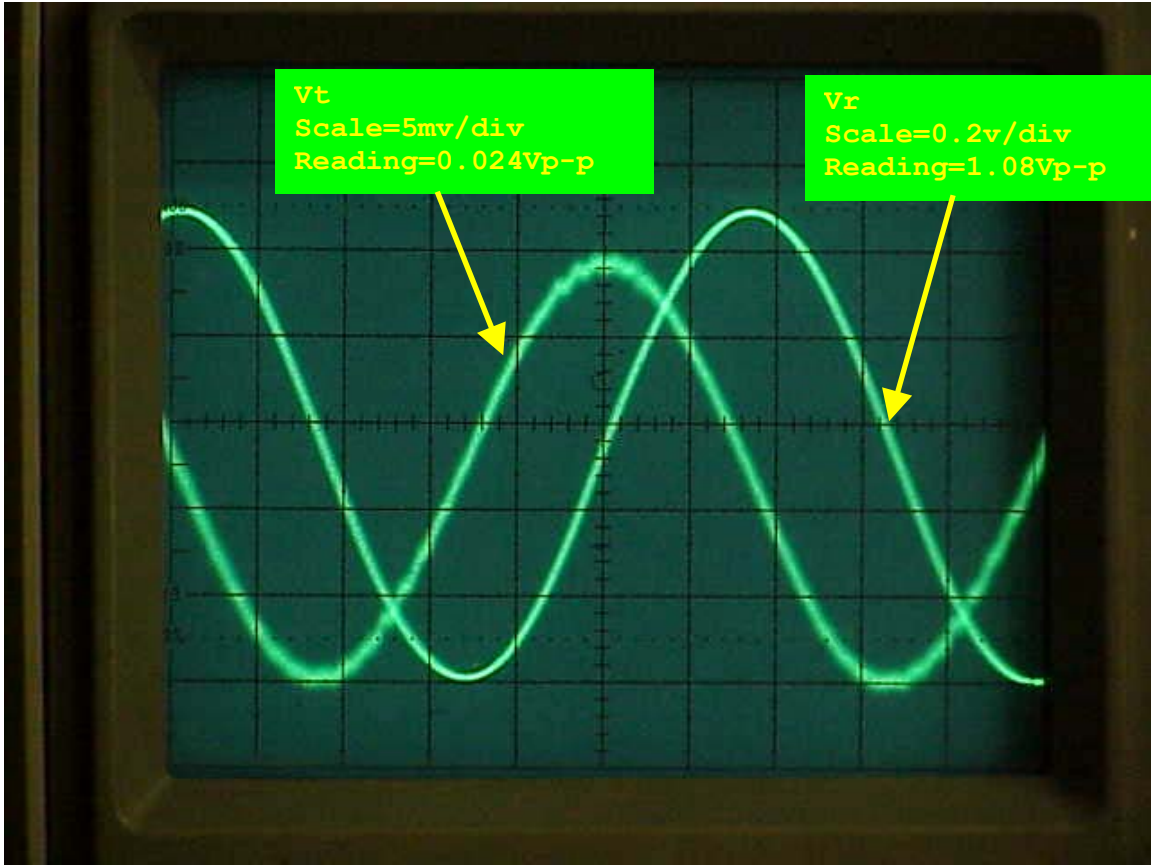
- 10) Discard the triangle section and place the remaining sections over the second copy of the template. You may want to tape the center section in place. Then spray adhesive over the exposed triangles lines. Remove the masks and allow the adhesive to set. Then lay wire over the template. When laying the wire, you should tape the template to the table or you might want to adhere it to cardboard prior to this step.



- 11) Connect the triangle to scope and the function generator as shown in figure 5-2 on page 16 of the paper "New Induction." Use a 33-ohm resistor.



12) The following waveforms were obtained from this experiment for frequency set to 300khz.



The circuit readings are:

- a) Frequency = 301300. The value read from the counter as the above picture was taken.
- b)  $R = 32.7$  ohms. Measured just AFTER the above photo was taken.
- c)  $V_t = 0.024$  Vp-p.
- d)  $V_r = 1.08$  Vp-p.

13) To compute the inductance from the measurements above, you can calculate it from the equations on page 16 of the document OR you can use the "Experimental Mutual Inductance" screen. You can get to this screen in NEW\_IND.TBK from the main screen or by clicking "PREV" on the "Mobius Triangle" screen. Either way, the above data yields  $M = 3.83845310255926e-007$  Henries.

14) The value computed on the Mobius Triangle template screen for accuracy of 0.001 (0.1%) is:  $M = 3.83600959903603e-007$ . When the accuracy selected is 0.005 (0.5%) the result is:  $3.83482704661846e-007$ .

- 15) Accuracy for the 0.001 computation is 0.06%. The accuracy for the 0.005 computation is 0.1%.  
The accuracy is computed by the following expression:

$$Acc = |100 * (computed - measured) / measured|.$$

The results show excellent agreement between computed values and experimentally measured values.