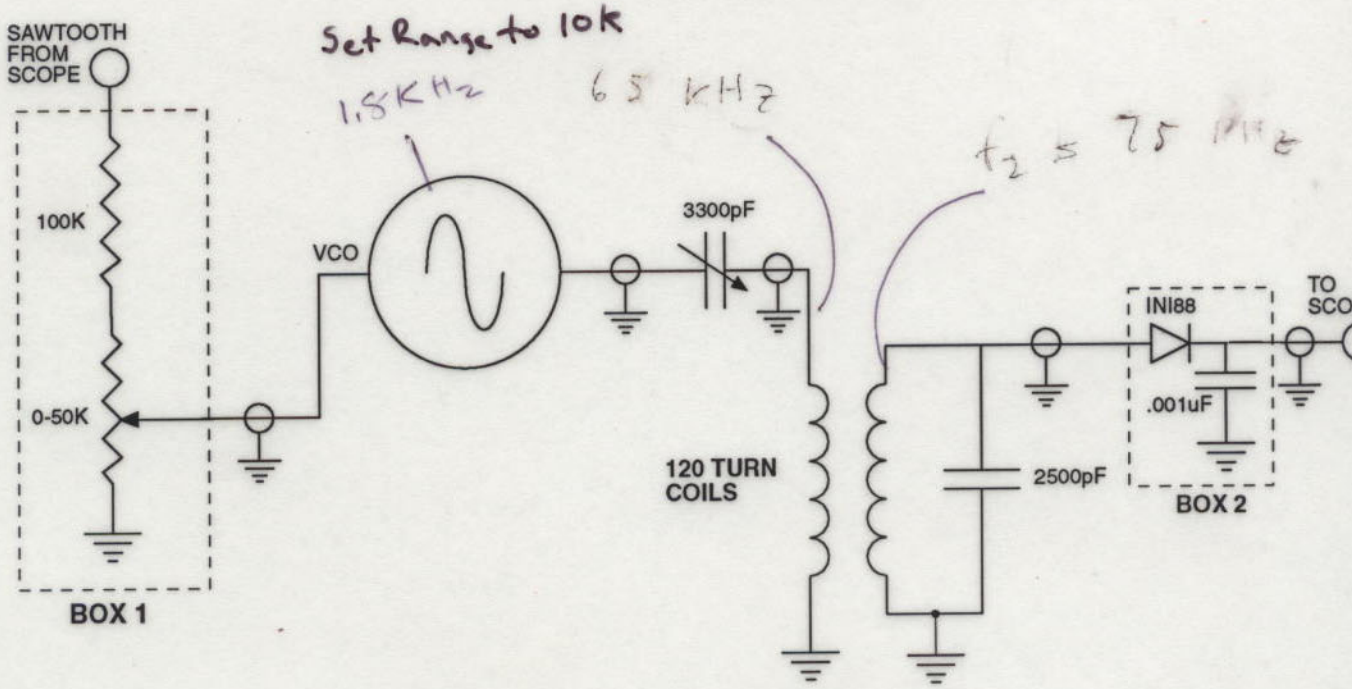
L5

MUTUAL INDUCTANCE WITH TWO COILS RESONANT

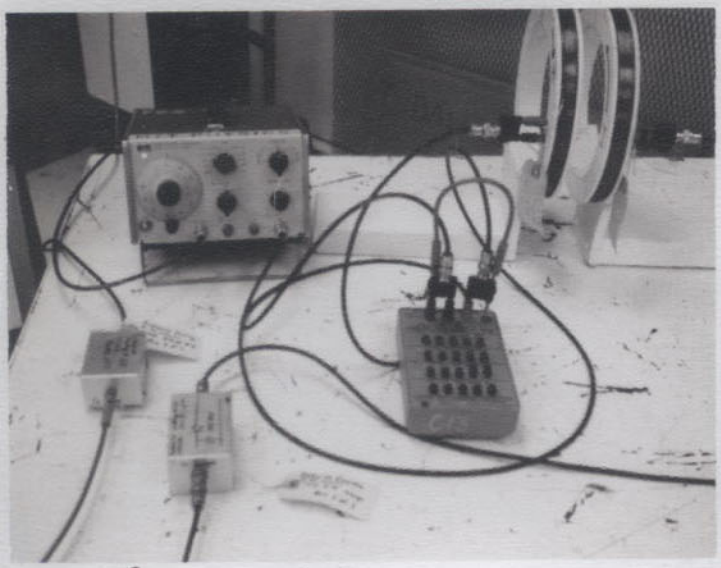


L5 MUTUAL INDUCTANCE WITH TWO COILS RESONANT

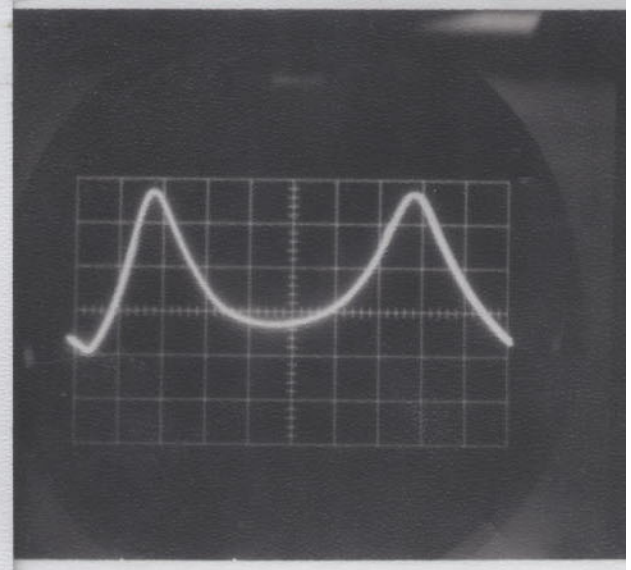
L5

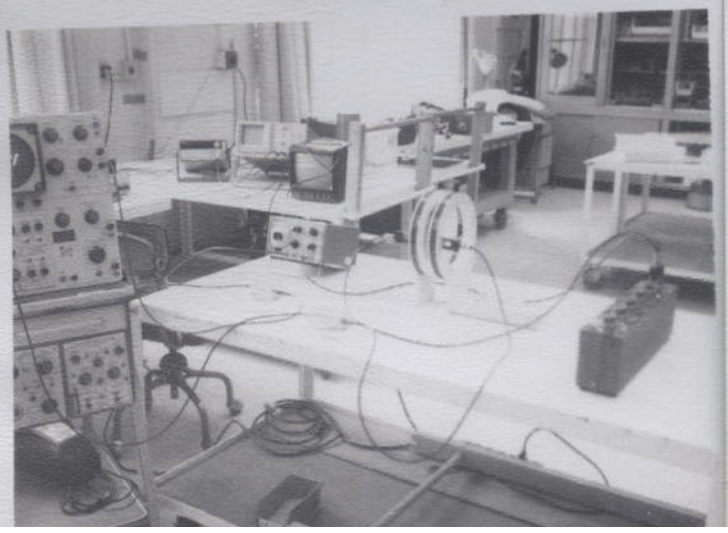
LC & RLC CIRCUITS - Resonance

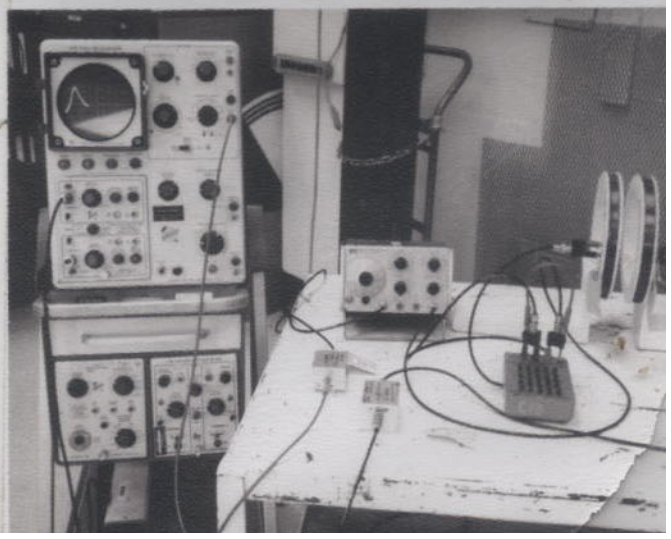
Two 120-turn coils are placed facing each other on the lectrue table. Each of the coils are series with a capacitor, the values of which have been chosen such that the two LC circu have slightly different resonant frequencies. One of the coils is driven by a sine wa generator, whose output is swept over a frequency range encomapssing the reson frequency of both LC circuits. When the voltage across the capacitor of the secondary coi displayed on an oscilloscope, a double resonance curve caused by the resonance in ea coil is observed.



Range = 10K





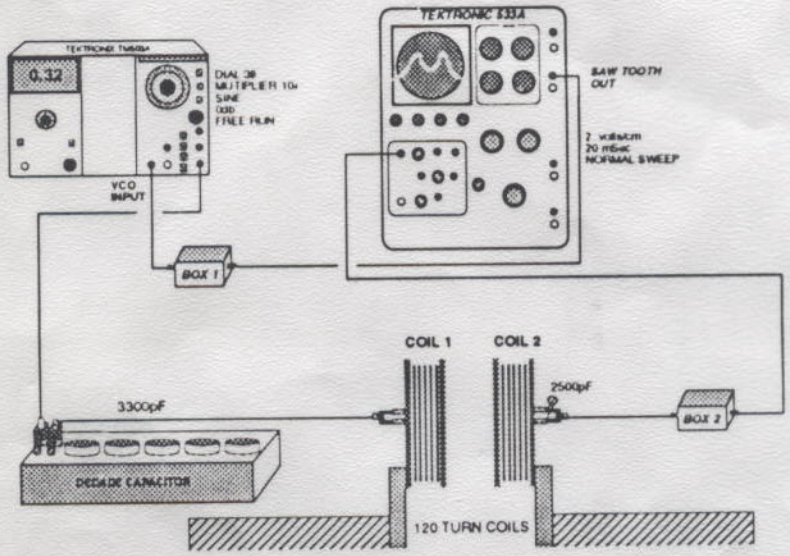


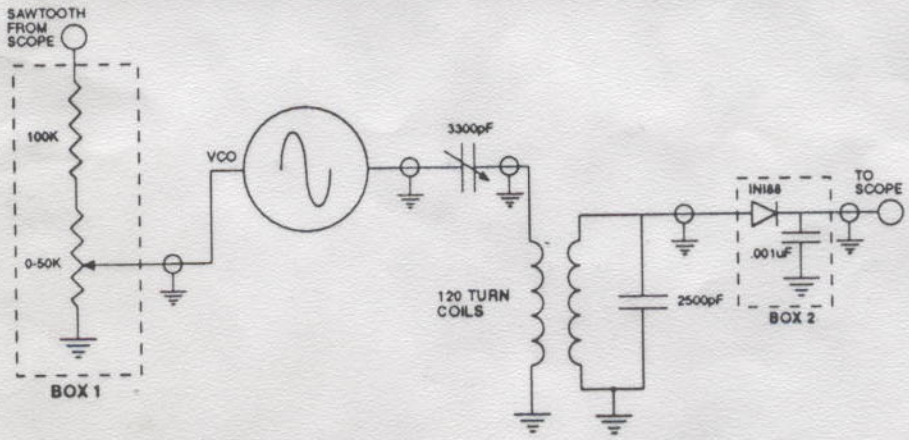
MUTUAL INDUCTANCE W/TWO COILS RESONANT

L5

RESONANCE- LC Resonance

Two 120-turn coils are placed facing each other on the lecture table. Each of the coils is in serie with a capacitor, the values of which have been chosen such that the two LC circuits have slight different resonant frequencies. One of the coils is driven by a sine wave generator, whose output swept over a frequency range encompassing the resonant frequency of both LC circuits. When t voltage across the capacitor of the secondary coil is displayed on a oscilloscope, a resonant cur caused by the resonance in each coil is observed.





RESONANT FREQUENCY: $f = \frac{1}{2\pi}\left(\frac{1}{\sqrt{LC}}\right)$

1st circuit (coil) L≈ 5 X 10^{-3} H C = 3300pF f = 39 kHz

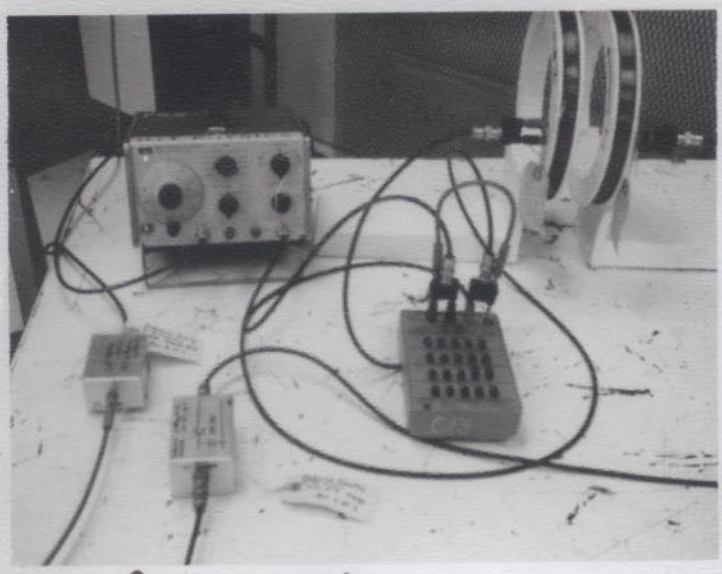
2nd circuit (coil) L≈ 5 X 10^{-3} H C = 2500pF f = 45kHz

L5 MUTUAL INDUCTANCE WITH TWO COILS RESONANT

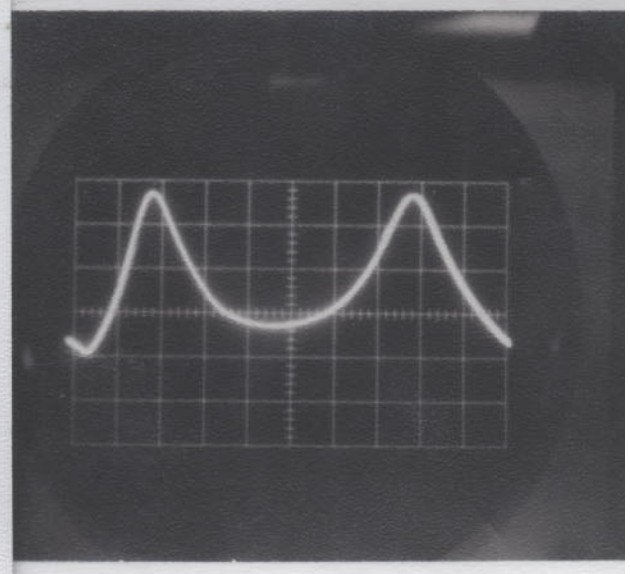
L5

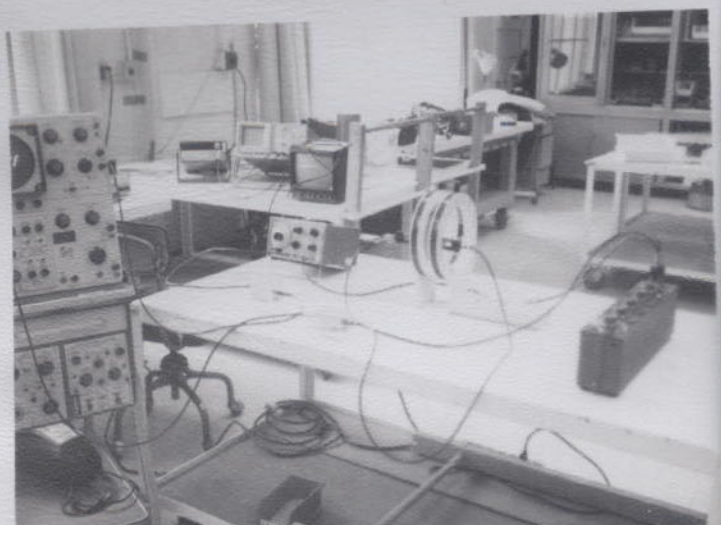
LC & RLC CIRCUITS - Resonance

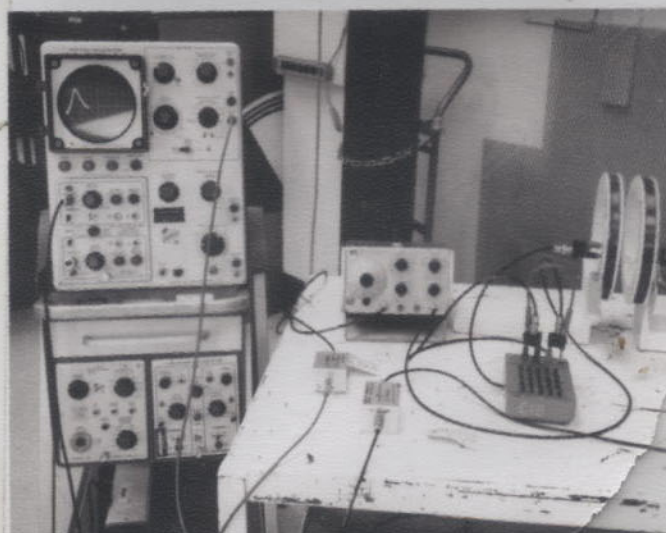
Two 120-turn coils are placed facing each other on the lectrue table. Each of the coils are series with a capacitor, the values of which have been chosen such that the two LC circu have slightly different resonant frequencies. One of the coils is driven by a sine wa generator, whose output is swept over a frequency range encomapssing the reson frequency of both LC circuits. When the voltage across the capacitor of the secondary coi displayed on an oscilloscope, a double resonance curve caused by the resonance in ea coil is observed.



Range = 10K





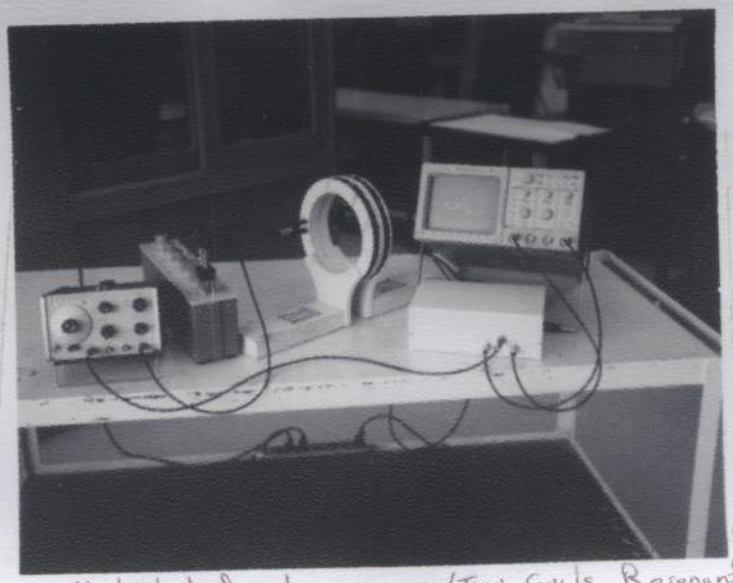


L5

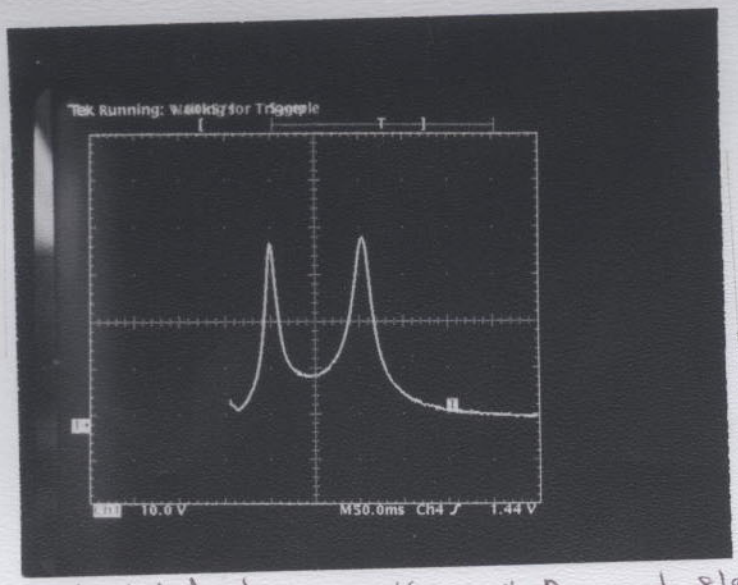
MUTUAL INDUCTANCE W/TWO COILS RESONANT

L

RESONANCE-LC Resonance



L5 Mutual Inductance w/Two Coils Resonant 8/98



L5 Mutual Inductance w/two coils Resonant 8/98

L5 MUTUAL INDUCTANCE W/TWO COILS RESONANT L5

RESONANCE-LC Resonance

Parts List:

- Tektronix 533 scope
- HP 3310A function generator
- GenRad decade capacitor
- two miniboxes labeled "inductive coupling of LC circuits"
- 4- male banana to female BNC connector
- 5- BNC cables
- 2 -120 turn coils
- 2500pF capacitor

Setup:

1. Connect the 2500pF cap across the terminals of one of the coils
2. Attach the banana to BNC adaptor to each of the coils terminal pairs
3. Connect one banana to BNC adaptor between High and GND of the decade capacitor.
4. Wire the rest of the circuit according to schematic.
5. Set the decade capacitor to 3300pF.
6. Set the function generator to ≈38KHZ. Important: Range = 10K at 3-4
7. Set the scope to 10 msec/div., internal trigger, 1 v/cm vertical, DC coupled.

NOTE: adjustment of resistor in Box 1 might be necessary.

Operation:

Adjust both coils until the peaks of each resonant point are equal. By varying the coupling between the two coils, one c
show that both amplitude and frequency are varied.