Experiment No.3

Objective: To determine unknown inductance by using Anderson's bridge

Apparatus Used:

S. No.	Name of the apparatus	Quantity
1	Lab trainer kit	1
2	Multimeter	1
3	Unknown inductor	1

Theory: In this bridge, the self inductance is measured in terms of a standard capacitor. This method is applicable for precise measurement of self-inductance over a very wide range of values. Figure below show the connections and the phasor diagram of the bridge for balanced conditions.

Let L1 = self inductance to be measured, R1 = resistance of self-inductor, r,R2,R3,R4 = known non-inductive resistance r1 = resistance connected in series with self-inductor,

At, balance, I1 =I3 and I2 = IC +I4.

Now, I1R3 = IC/jωC therefore, IC = I1jωCR3.

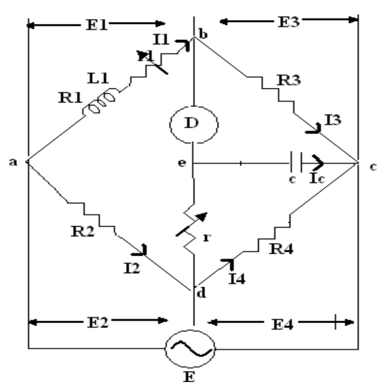
Writing the other balance equations.

I1(r1+R1+jωL1) = I2R2 + ICr and IC(r+1/jωC) = (I2-IC) R4

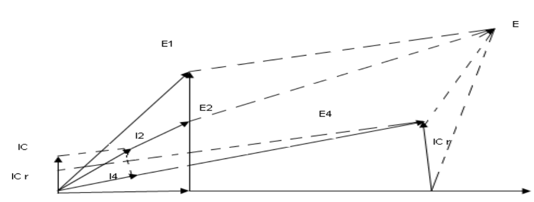
By substituting IC value and equating real and imaginary parts

R1 = R2R3/R4 – r1

L1 = C R3/R4{ r(R4+R2)+R2R4}**Circuit Diagram**



Phasor Diagram:



Procedure:

1. Connect the circuit as shown in the figure.
2. Connect the unknown inductance in L1.
3. Select any value of r.
4. Connect the multimeter between ground and output of imbalance amplifier.
5. Vary r1 and r, from minimum position, in clockwise direction.
6. Calculate the inductance L1 by substituting known values.

Observation Table:

S. No.	Actual value of L in mH	R in ohms	Practical value of L in mH

Results: The unknown inductance is determined using the Anderson's bridge.