

Experiment No. 4

Objective: Measurement of inductance by Owen's bridge

Apparatus Used:

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

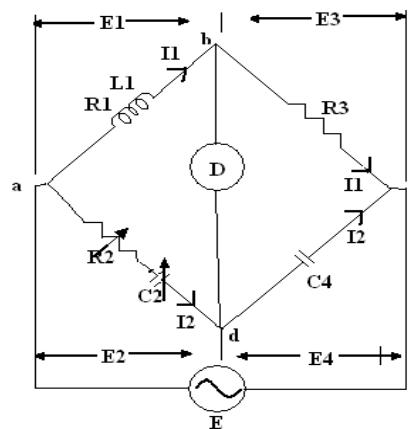
Theory: This bridge is used for measurement of an inductance in terms of capacitance.

Let L_1 = unknown self-inductance of resistance R_1 , R_3 = fixed non-inductive resistance, R_2 = variable non-inductive resistance, C_4 = fixed standard capacitor, C_2 = variable standard capacitor.

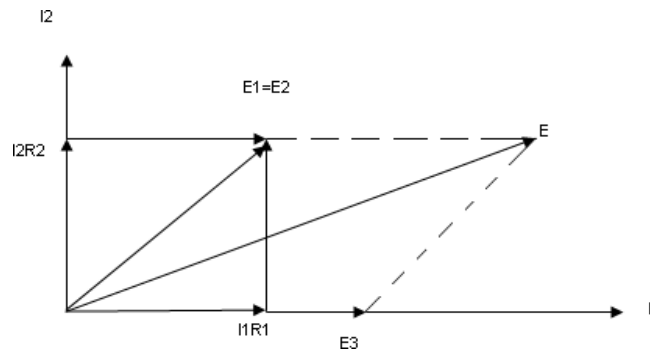
At balance, $(R_1 + j\omega L_1)(1/j\omega C_4) = (R_2 + 1/j\omega C_2) R_3$.

Separating the real and imaginary terms, we obtain: $L_1 = R_2 R_3 C_4$ and $R_1 = R_3 C_4 / C_2$.

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 R1, R4 and C3..
4. Connect the multimeter between ground and output of imbalance amplifier.
5. Vary R1 and R4, from minimum position, in clockwise direction.
6. If the bridge does not balance change the value of C3.
7. Calculate the inductance L1 by substituting known values.

Observation Table:

S.NO	R2	R4	C3	$L1 = R2C3R4$	True value of L1

Result: Actual and practical values of Inductances are found to be nearly equal.