

In-Class Exercise: Hay bridge.

STUDENT NAME:

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Figure 1 shows the Hay bridge, where the **device under test** is the inductor (coil) with parameters L_x and R_x . This is a non-ideal coil where we take the resistance of the coil into consideration. The input signal is a sine wave with a frequency of $\omega \frac{rad}{s}$.

$$Z_x = \tag{1}$$

$$Z_1 = \tag{2}$$

$$Z_2 = \tag{3}$$

$$Z_3 = \tag{4}$$

Your job is to write out the bridge equilibrium and find expressions for L_x and R_x .

Questions:

- 1) Is the measurement dependent or independent of the frequency of the input signal?
- 2) Are the measurement of L_x and R_x independent? What does this mean for the person who is doing the measurement?

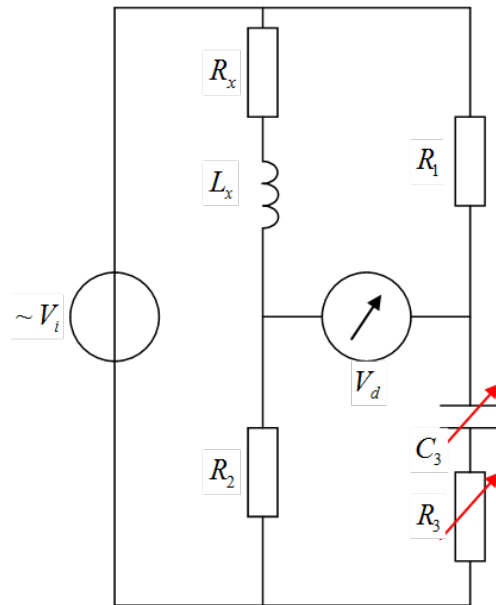


Figure 1: Shown is the Hay bridge, which is used to measure the inductance, resistance and quality factor of coils. L_x and R_x represent the device under test, and only R_3 and C_3 are adjustable with a decade box.