EEE 202 CIRCUIT THEORY
LAB 1

Quality Factor of an Inductor

Design at least two methods to measure the inductance and the quality factor of an inductor at a given frequency.

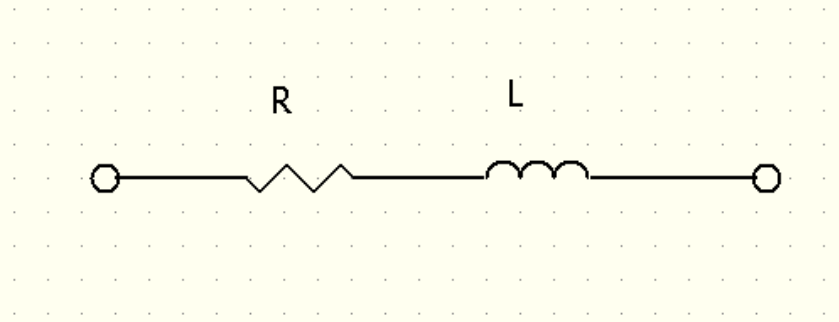

Figure 1: Inductor model using ideal components

As shown in Figure 1 Inductors may be considered as an ideal inductor connected in series with a resistor. Q of an inductor is defined as:

$$Q = \frac{w_0 L}{R} \tag{1}$$

Preliminary Work

Verify your proposed methods using SPICE.

Experimental Work

You will use two inductors, one will be provided to you in the lab and you will wind another inductor to a core which will be provided in the lab. Measure the inductance and quality factor of the both inductors using your methods at **four different frequencies** in the range 1MHz to 5MHz, away from self-resonance frequency. Compare your findings. Assess the accuracy of your measurement.

Available materials in the lab

Toroidal cores to design inductors or transformers: T25-10, T37-7, T38-8, T50-7 from Micrometals. Capacitors with standard values. Resistors with standard values. LM324 (DIP package) Opamp. 10cm x 10cm PCB board pieces with no pattern (just copper on one side) to solder your components.