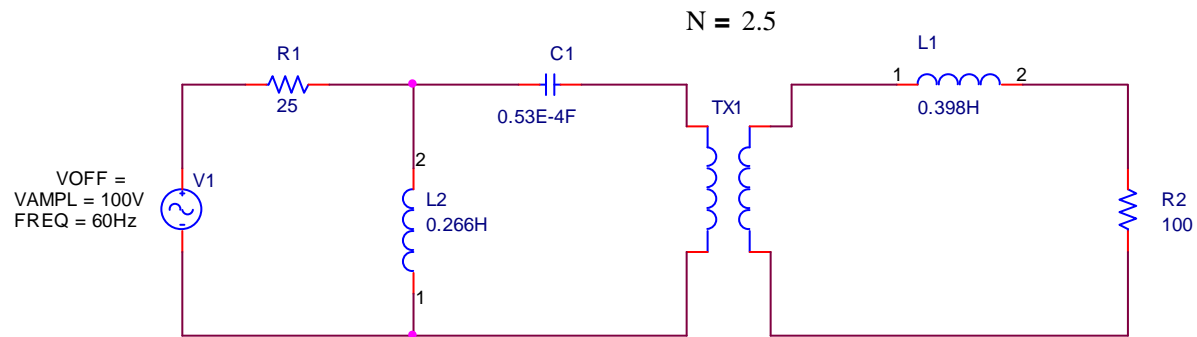


Problem 1) Ideal Transformers

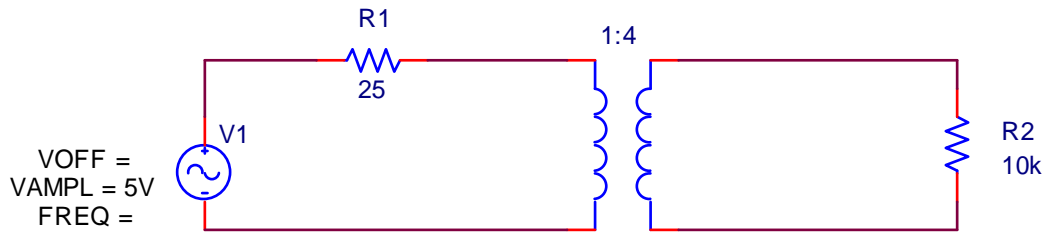


The above circuit has a 100 V, 60 Hz source.

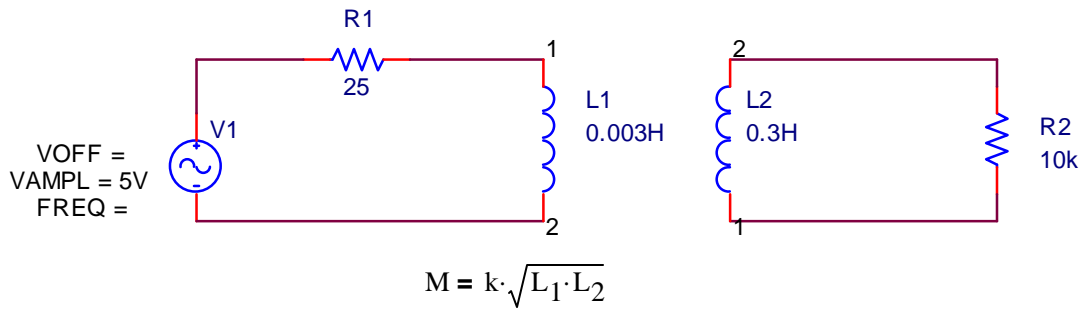
Hint: Draw in impedance form, and find Thevenin Equivalent first

- Determine the equivalent circuit when referring the secondary to the primary (and draw the circuit).
- Determine the equivalent circuit when referring the primary to the secondary (and draw the circuit).
- Determine the total complex power dissipated through the impedance in the primary.
- Determine the total complex power dissipated through the impedance in the secondary.
- Verify that the power dissipated is equal to the power generated by the source.

Problem 2) Real Transformers

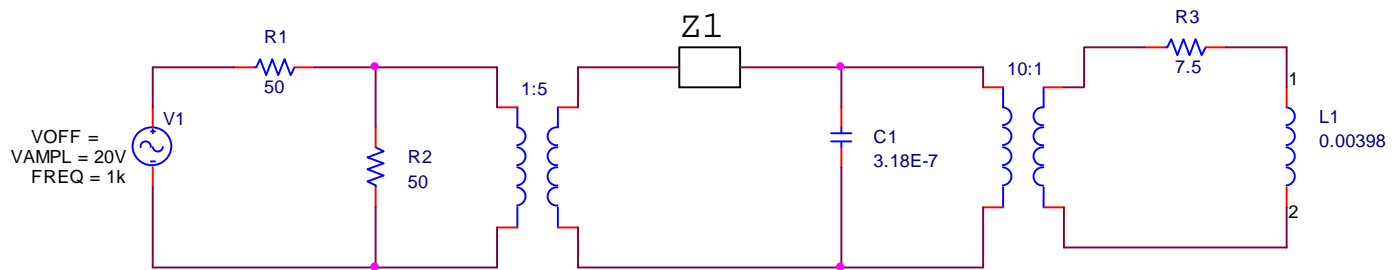


a. Determine the voltage across R2 in phasor form



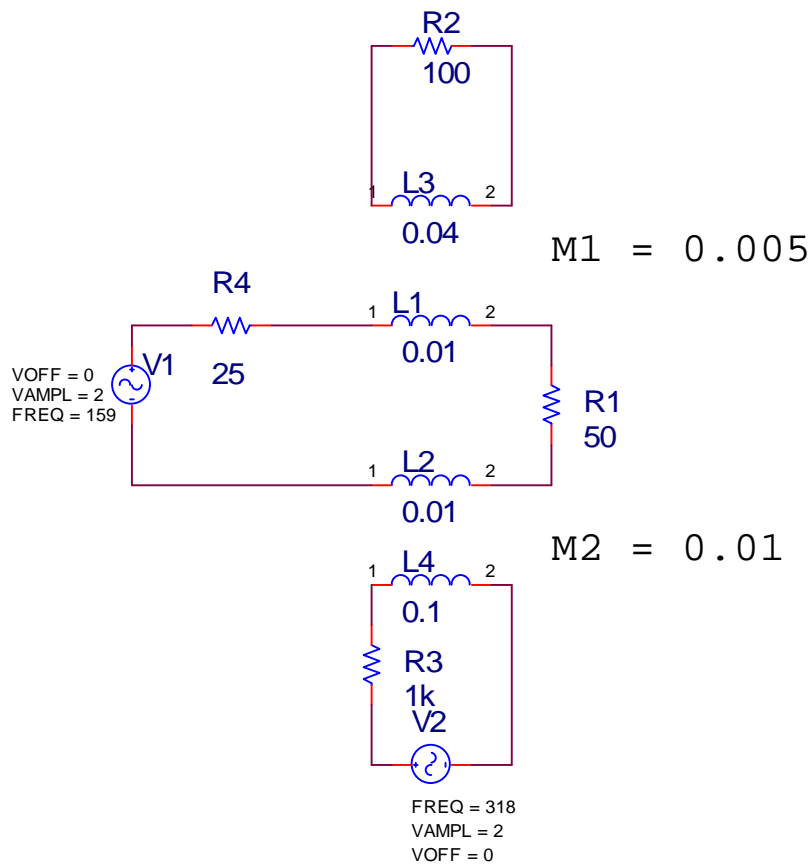
b. If the real transformer is constructed of two inductors (as show) and the coupling coefficient is $k=0.8$, determine the Tee model of the circuit. Draw your circuit.

Problem 3) Impedance matching



- a. For the transformer circuit above, design Z_1 such that the power dissipated across the resistor R_3 is maximized.

Problem 4) Mutual Inductance



Find the current and voltage through R1 in the above couple circuits. There are two locations with inductive coupling and both sets have additive coupling. Additionally, there are two voltage sources with different excitation frequencies. Suggestion, use superposition in your analysis.