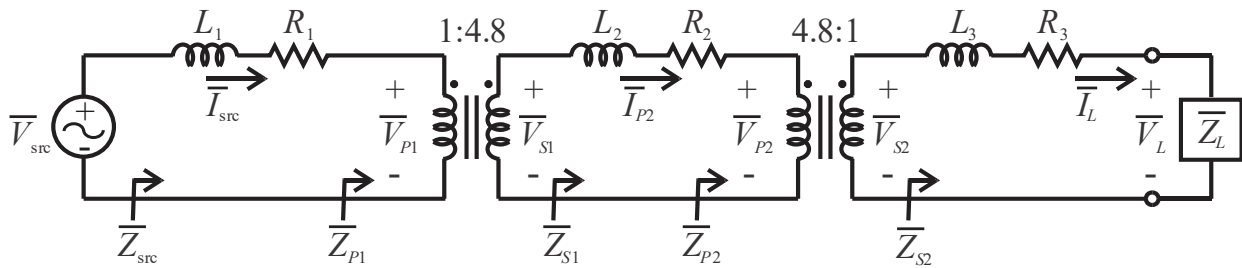


EE 330 Energy Systems (Fall 2026)

Homework 4

Monday, September 28, 2026

- 1) For the circuit shown, it is given: $\bar{V}_{src} = 125 \angle 0^\circ \text{ V}_{rms}$, $f = 400 \text{ Hz}$, $L_1 = 0.5 \text{ mH}$, $L_2 = 1.2 \text{ mH}$, $L_3 = 0.2 \text{ mH}$, $R_1 = 0.4 \Omega$, $R_2 = 1.4 \Omega$, $R_3 = 0.4 \Omega$, and $\bar{Z}_L = 6 \angle 60^\circ \Omega$.
- a) Find the indicated impedances (rectangular format), b) Find the indicated currents and voltages (RMS phasor format w/ angle in degrees). c) Calculate $V_L / V_{src} * 100\%$. d) Determine the complex power provided by the source, complex power delivered to the load, and complex power 'lost' in-between. e) What percent of the real power makes it from the source to the load? Assume ideal transformers.



- 2) 3-1 First, draw approximate phasor equivalent circuit. Then, find RMS phasor secondary current and voltage. In addition to the primary current (RMS phasor & time-domain), find the primary voltage (RMS phasor & time-domain).
- 3) 3-2 For part d), also find the copper and core losses.
- 4) 3-3a Also, find the equivalent circuit referred to the high-voltage side.
- 5) 3-8ab modified so that $R_{C,pu} = 100$. For part b), also find the copper and core losses as well as efficiency.

Due Friday, October 2, 2026.