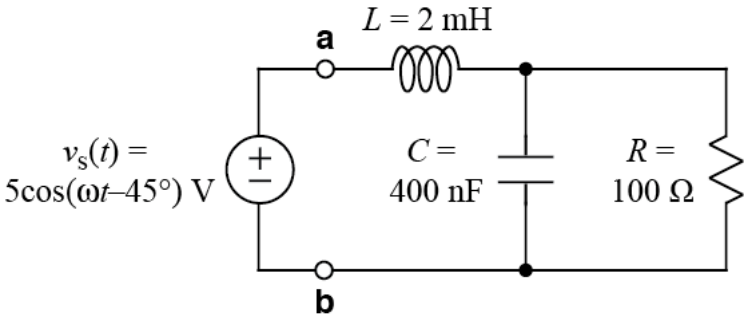
HOMEWORK #7

1.



Note: ω = 25 k r/s.

Do the following for the impedance to the right of the a, b terminals:

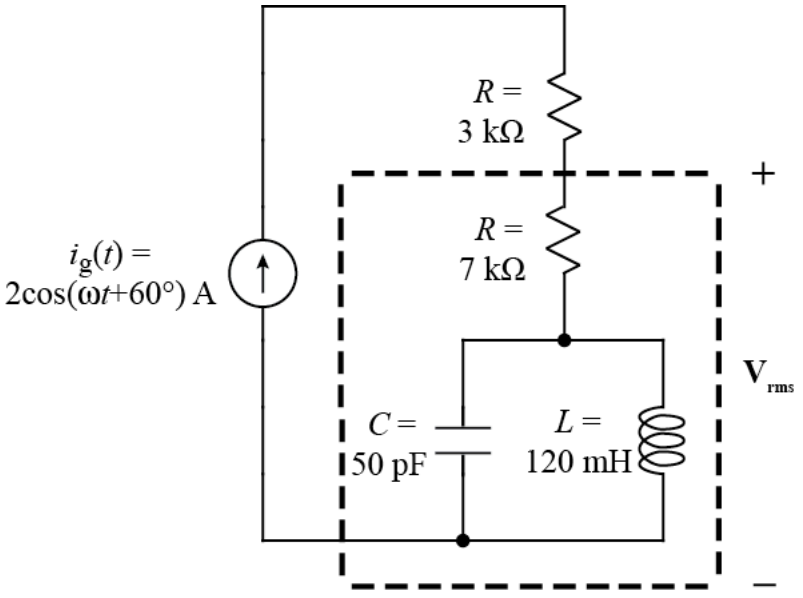
a) Calculate complex power S = P + jQ.

b) Calculate average (or DC) power.

c) Calculate maximum instantaneous power.

d) Sketch the power waveform, $p(t)$.

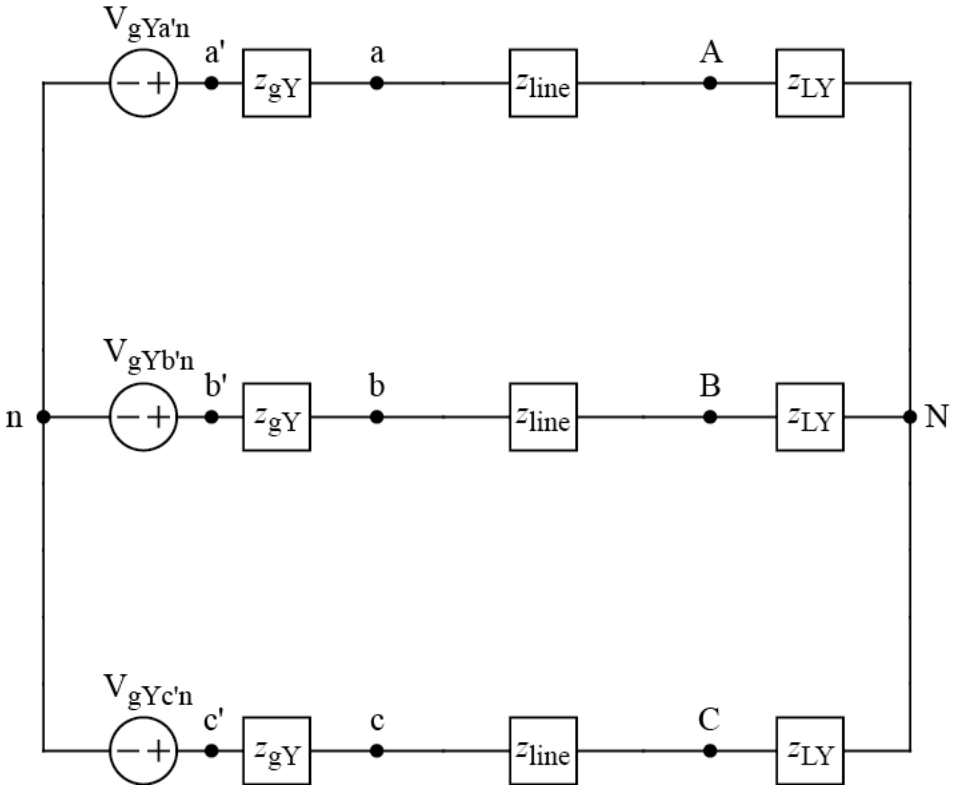
2.



a) Calculate $\mathbf{V}_{rms}$. Note: ω = 1 Mr/s.

b) Calculate the complex power, S, for the components inside the box.

3.



$V_{gYa'n} = 120\angle 0°$ V $\quad z_{gY} = j0.3\ \Omega$

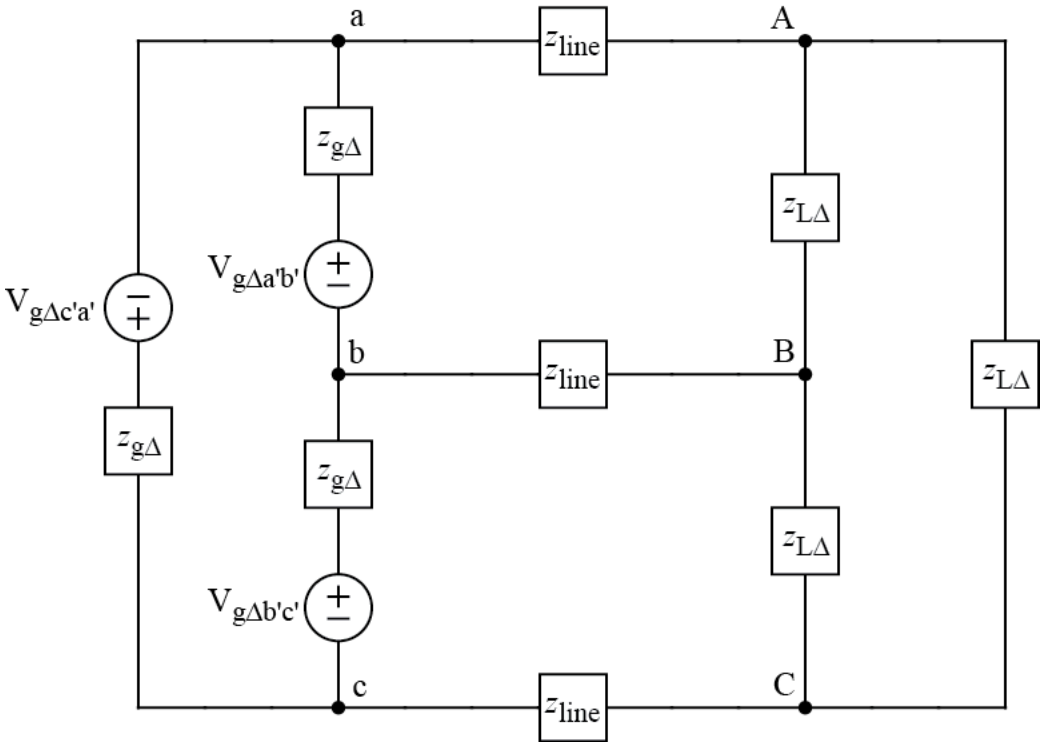
$V_{gYb'n} = 120\angle +120°$ V $\quad z_{line} = j0.6\ \Omega$

$V_{gYc'n} = 120\angle -120°$ V $\quad z_{LY} = 3 - j0.1\ \Omega$

a) Draw the single-phase equivalent circuit.

b) Calculate $\mathbf{V}_{aA}$.

4.



$V_{g\Delta a'b'} = 265\angle 0°$ V $\quad z_{g\Delta} =$ 8.3Ω resistor in series with 5/6μF capacitor

$V_{g\Delta b'c'} = 265\angle -120°$ V $\quad z_{line} =$ 1 Ω resistor in series with 700 nH inductor

$V_{g\Delta c'a'} = 265\angle +120°$ V $\quad z_{L\Delta} =$ 4 Ω resistor in series with 10/9μF capacitor

a) Draw the single-phase equivalent circuit. Note: $\omega = 1$ Mr/s.

b) Calculate $\mathbf{I}_{bB}$.

5. a) Calculate $\mathbf{V}_{AB}$.

b) Write a numerical time-domain expression for $v_{AB}(t)$.