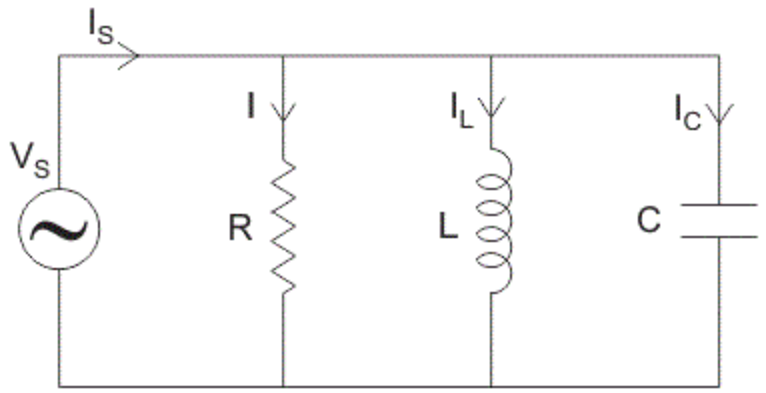
32. A 4.7 kΩ resistor has a conductance of:
    a. 213 mS
    b. 213 µS
    c. 4.7 S
    d. 4.7 mS

33. At 62 kHz, a 527 nF capacitor has a susceptance of:
    a. 4.87 mS
    b. 4.87 S
    c. 205 S
    d. **205 mS**

34. At 261 Hz, a 682 mH inductor has a susceptance of:
    a. 1.12 kS
    b. 1.12 S
    c. 894 µS
    d. 894 mS

35. If Z_L = (503 + 223j) Ω, Y_L =
    a. (223 + 503j) S
    b. (1.66 + 0.737j) mS
    c. (1.66 – 0.737j) mS
    d. 550 S



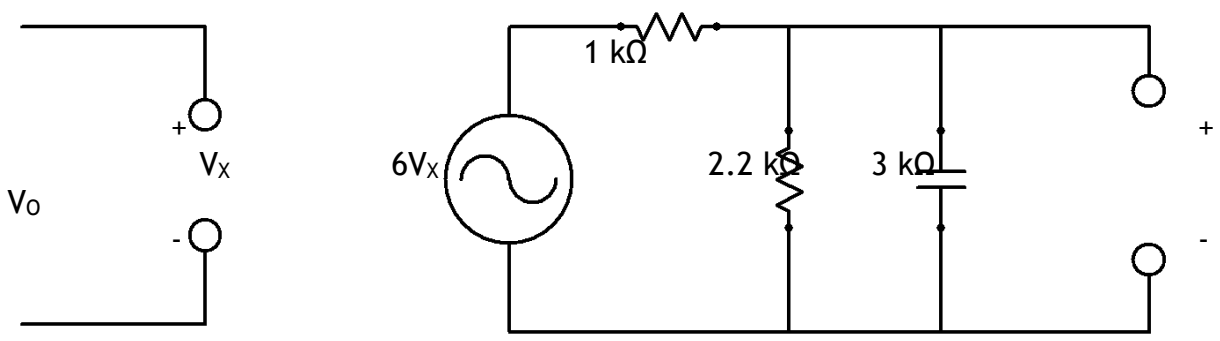
f = 388 kHz
L = 319 µH
C = 405 pF
R = 592 Ω

36. Total admittance seen by the source is:

(1.715 mS ∠ -10°) = (1.689 - j0.299) mS

37. If I_S = (1.2 ∠ 70°) A, I_L =

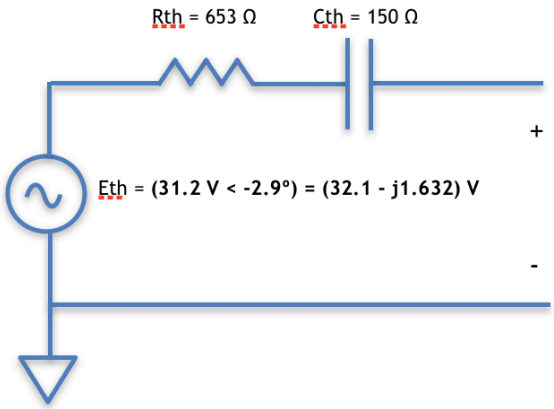
(899.5 mA ∠ -10°) = (0.886 -j0.156) mA

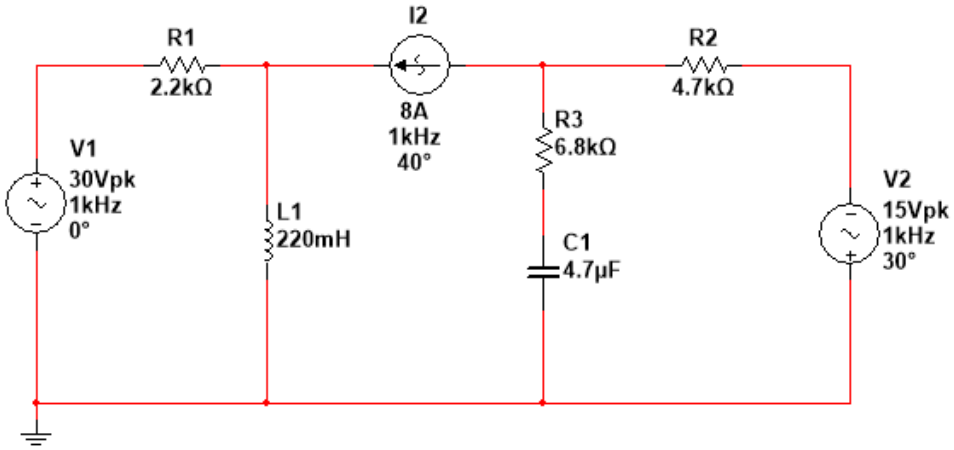


38. If $V_X = (8 \angle 10^\circ)$ V, what is V_O?

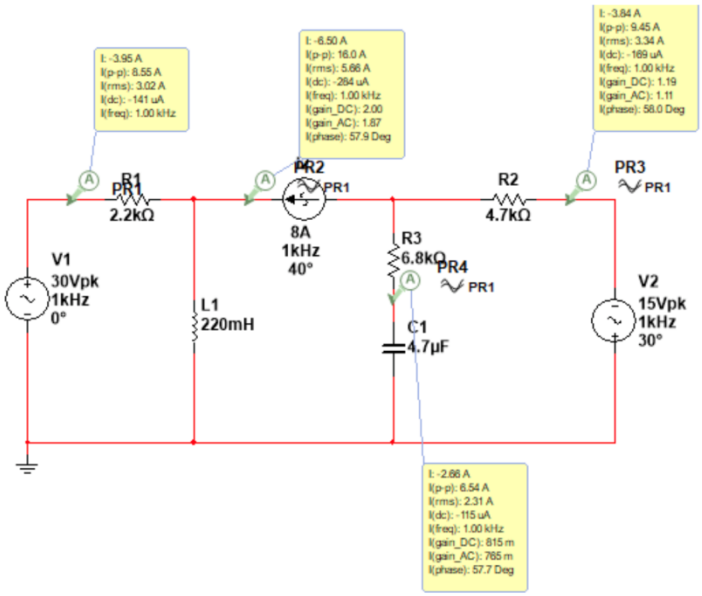
$(31.2 \text{ V} \angle -2.9^\circ) = (32.1 - j1.632)$ V

39. Draw the Thevenin equivalent circuit external to V_O, assuming $V_X = (8 \angle 10^\circ)$ V.



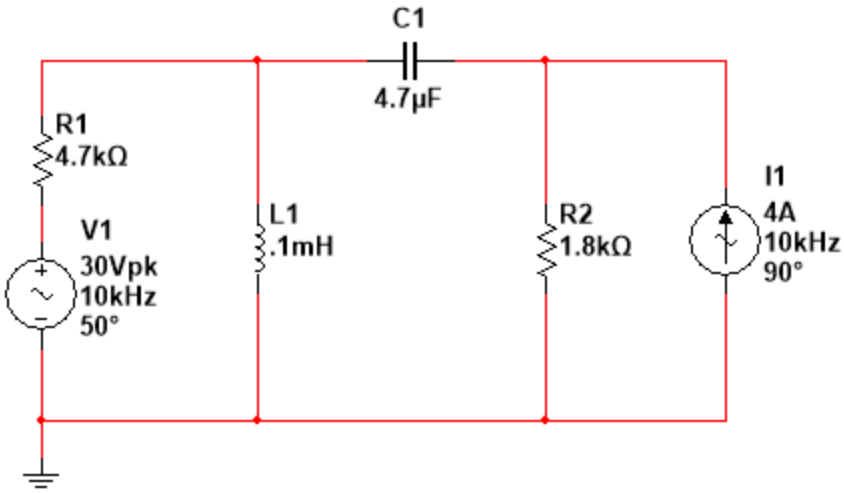


40. Using **mesh analysis**, find the 3 loop currents for the circuit above.

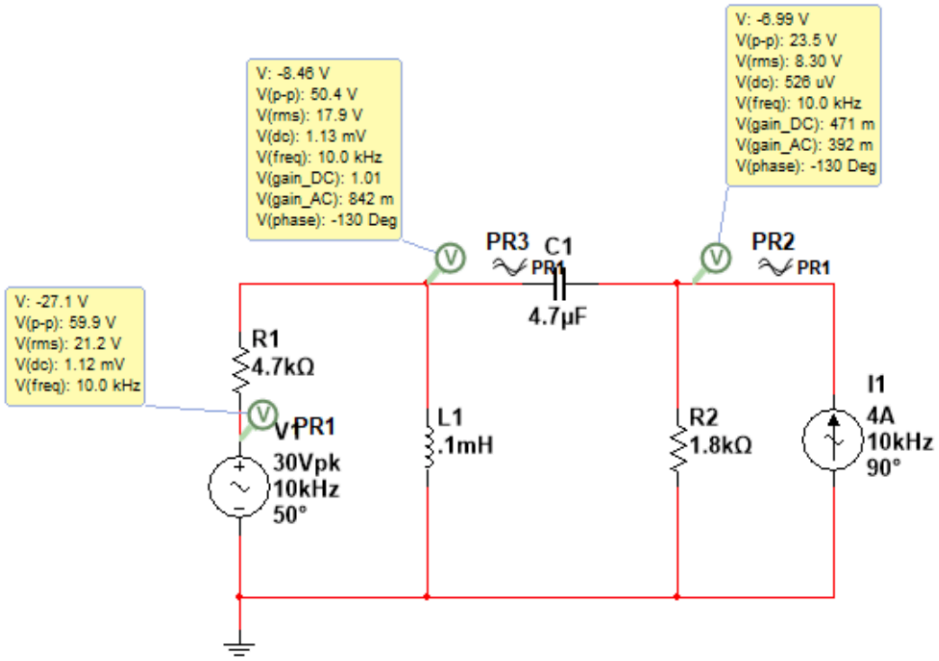


41. How much power is dissipated by the 3 resistors?

108.8 kW

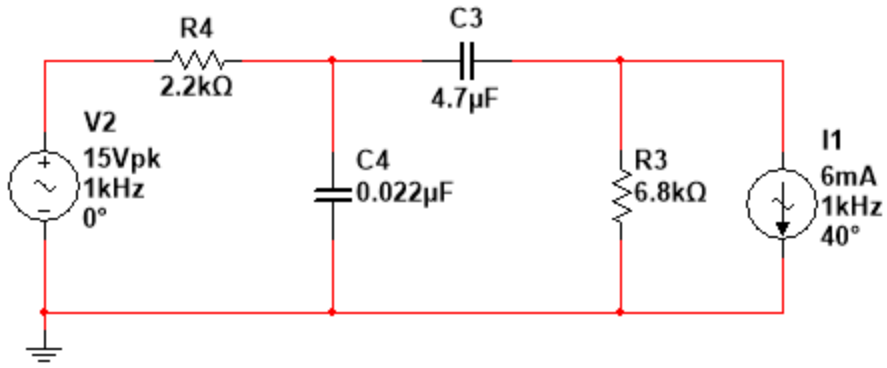


42. Using **nodal analysis**, find the voltage at all nodes in the circuit above.



43. What is the current through the capacitor C_1?

(3.972 A ∠ -40°) = (3.043 - j2.553) A



44. Using **superposition**, find the voltage across R_3.

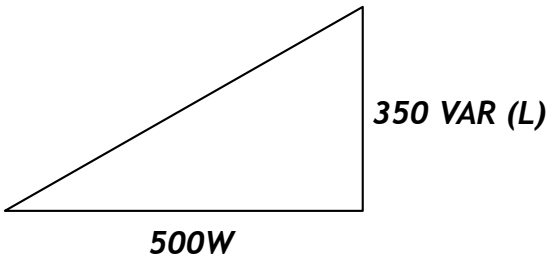
(7.038 V ∠ 102°) = (-1.463 + j6.884) V

45. How much power is supplied by the source I_1?

42.23 mW

46. For the power triangle to the right, find S and θ.

S = (610 ∠ 35°) VA

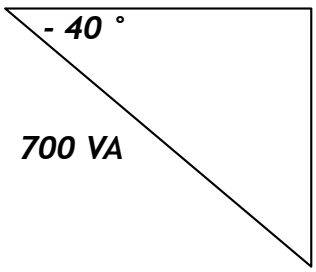


47. For the power triangle above, if the source voltage is (120 ∠ 0°) V_{rms}, what is the source current?

I = S* / V = (610 ∠ -35°) VA / (120 ∠ 0°) V = **(5.08 ∠ -35°) A**

48. For the power triangle to the right, find P and Q.

P = 536 W
Q = 450 VAR (C)

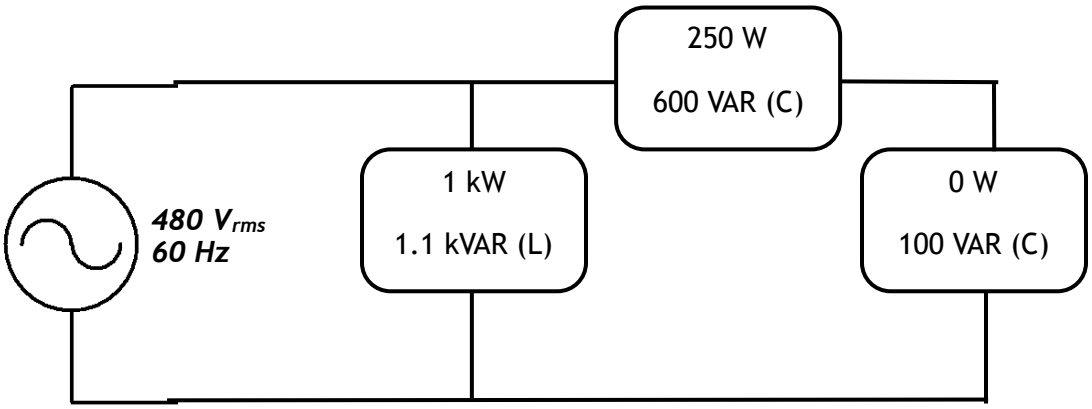


49. If the source voltage is 240 V_{rms} and the frequency is 50 Hz, what value of inductor would be needed to achieve unity power factor in the system above?

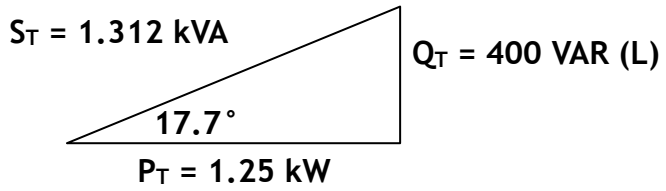
Q_L = 450 VAR = (240 V_{rms})^2 / X_L

X_L = 128 Ω = 2πfL

L = 407 mH



50. Draw a fully-labeled power triangle for the system above (P, Q, S, θ)



51. For the 1 kW load, determine what component(s) comprise it.

$R = (480\ V_{rms})^2 / 1\ kW =$ **230.4 Ω**

$X_L = (480\ V_{rms})^2 / 1.1\ kVAR = 209.5\ \Omega = 2\pi fL$

L = 556 mH

52. What component (type and value) would be needed to correct the system power factor?

$X_C = (480\ V_{rms})^2 / 400\ VAR = 576\ \Omega = 1 / (2\pi fC)$

$C = 1 / (2\pi * 60Hz * 576\Omega) =$ **4.605 µF**

Changlog:

1. Answers to #35 were updated.