

1. (10 points)

Mark all of the choices that are true:

In an inductive circuit,

a) Current leads voltage

b) Voltage leads current

c) Current lags voltage

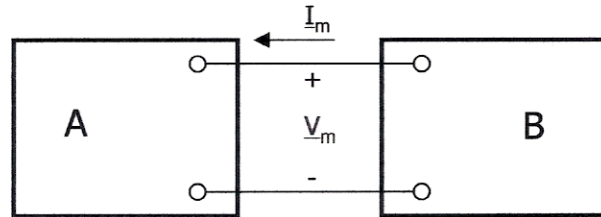
d) None of the above

e) All of the above

SOLUTION

2. (36 points)

If $\underline{V}_m = 50.0^\circ$ and $\underline{I}_m = 40.120^\circ$, find the complex power S associated with (either provided by or absorbed by) block B.



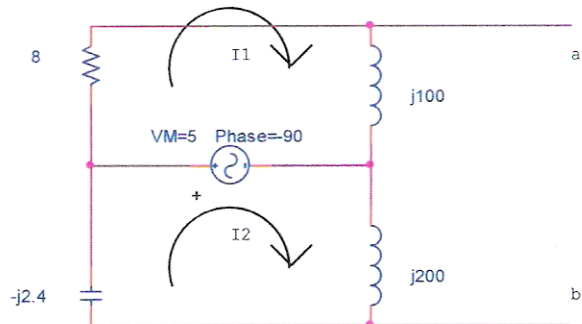
SOLUTION

By the Passive Sign Convention, from the standpoint of box B, a negative sign must be used in the V-I calculation.

$$S = -\frac{1}{2} \underline{V}_m \underline{I}_m^* = -\frac{1}{2} (50 \angle 0^\circ) (40 \angle -120^\circ) = -1000 \angle -120^\circ$$

$$S = 500 + j866$$

Midterm 1
EE110
Problem 3
Solution



Find the Thevenin Equivalent looking into terminals a and b

$$Z_{th} = (8 \parallel j100) + (-j2.4 \parallel j200)$$

$$Z_{th} = 7.97 + j0.639 - j2.43$$

$$Z_{th} = 7.97 - j1.79$$

$$Z_{th} = 8.17 \angle -12.66^\circ$$

$$I_1(8 + j100) - 5 \angle -90^\circ = 0$$

$$I_1 = -0.0498 - j0.00398$$

$$I_2(j200 - j2.4) + 5 \angle -90^\circ = 0$$

$$I_2 = 0.0253$$

$$V_{j100} = I_1(j100)$$

$$V_{j200} = I_2(j200)$$

$$V_{th} = V_{j100} + V_{j200}$$

$$V_{th} = 0.398 + j0.08 = 0.406 \angle 11.36^\circ$$