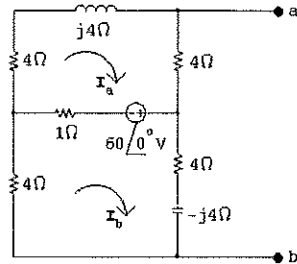


Problem 9.47

To find V_{Th}



$$(9 + j4)I_a - I_b = -60/0^\circ$$

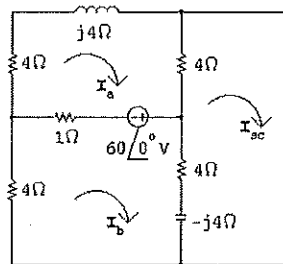
$$-I_a + (9 - j4)I_b = 60/0^\circ$$

Solving,

$$I_a = -5 + j2.5 \text{ A}; \quad I_b = 5 + j2.5 \text{ A}$$

$$V_{Th} = 4I_a + (4 - j4)I_b = 10/0^\circ \text{ V}$$

To find $I_N = I_{sc}$



$$(9 + j4)I_a - I_b - 4I_{sc} = -60$$

$$-I_a + (9 - j4)I_b - (4 - j4)I_{sc} = 60$$

$$-4I_a - (4 - j4)I_b + (8 - j4)I_{sc} = 0$$

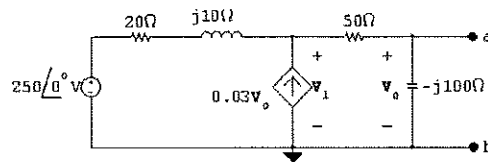
Solving,

$$I_{sc} = 2.07/0^\circ$$

$$Z_{Th} = \frac{V_{Th}}{I_{sc}} = \frac{10/0^\circ}{2.07/0^\circ} = 4.83 \Omega$$

Problem 9.48

To find V_{Th}



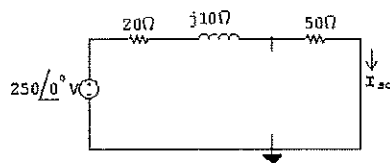
$$\frac{V_1 - 250}{20 + j10} - 0.03V_o + \frac{V_1}{50 - j100} = 0$$

$$\therefore V_o = \frac{-j100}{50 - j100} V_1$$

$$\frac{V_1}{20 + j10} + \frac{j3V_1}{50 - j100} + \frac{V_1}{50 - j100} = \frac{250}{20 + j10}$$

$$V_1 = 500 - j250 \text{ V}; \quad V_o = 300 - j400 \text{ V} = V_{Th}$$

To find $I_N = I_{sc}$



$$I_{sc} = \frac{250/0^\circ}{70 + j10} = 3.5 - j0.5 \text{ A}$$

$$Z_{Th} = \frac{V_{Th}}{I_{sc}} = \frac{300 - j400}{3.5 - j0.5} = 100 - j100 \Omega$$