

ECE 301
Fall Semester, 2005
HW #8

wlg Practice: No turn-in

Name _____
Print (last, first)

- (1) You are given the ideal transformer of Figure 1. (a) Find I_1 . Ans $I_1 = 3.07 \angle 39.81^\circ$ A.
(b) Find V_o . Ans $V_o = 3.07 \angle 39.81$ V.

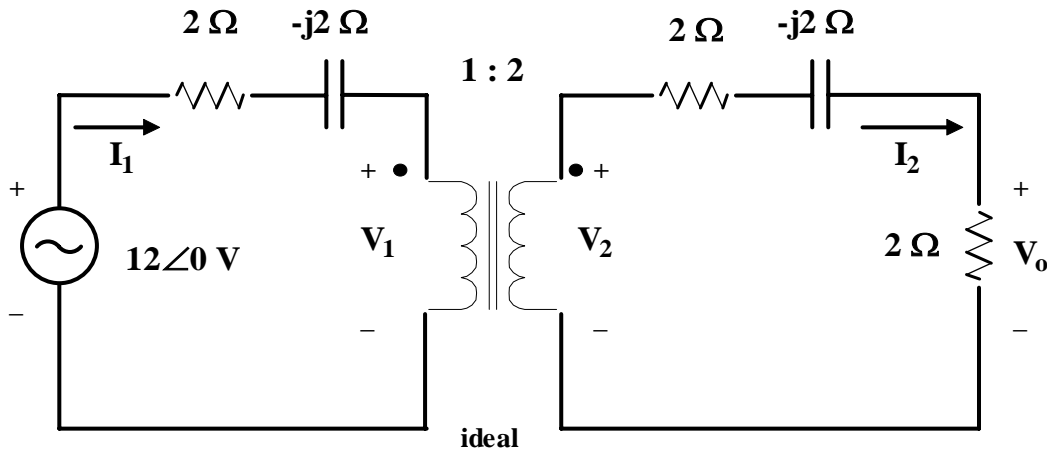


Figure 1: Circuit for problem 1.

- (2) Find I_o and Z_{ab} in the linear transformer of Figure 2. Ans: $I_o = 2.2 \angle -4.88^\circ$ A; $Z_{ab} = 1.5085 \angle 17.9^\circ \Omega$

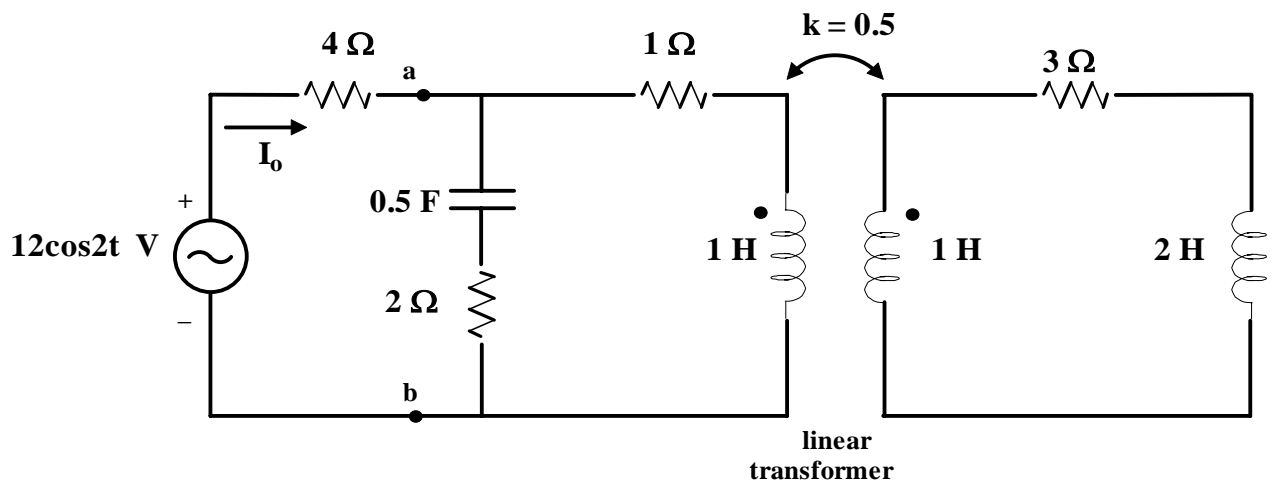


Figure 2: Circuit for problem 2.

- (3) Determine the input impedance looking into terminals a-b of the linear transformer circuit shown in Figure 3. Ans: $Z_{ab} = 0.1989 - j9.7 \Omega$

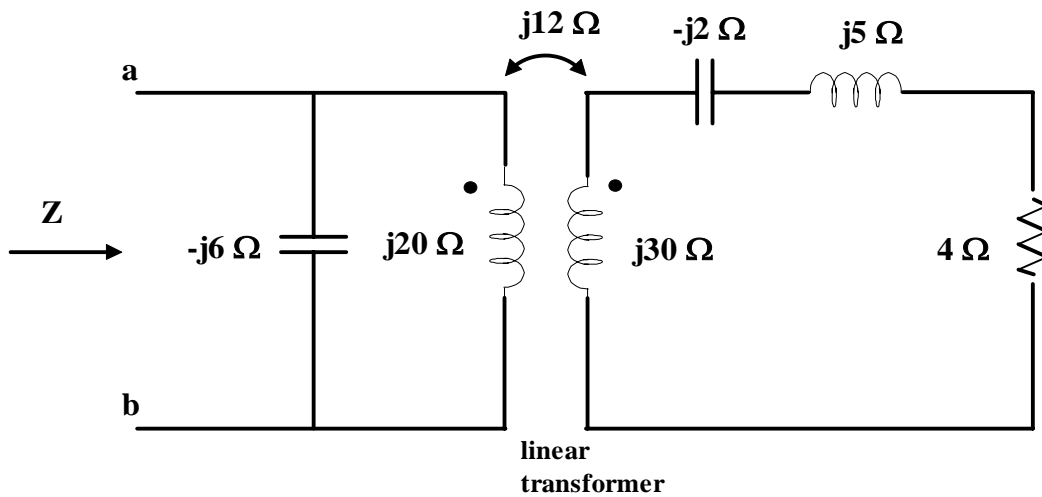


Figure 3: Circuit for problem 3.

- (4) (a) Find I_1 and I_2 in the ideal transformer of Figure 4. Ans: $I_1 = 1.07 \angle 5.88^\circ \text{ A}$, $I_2 = 0.536 \angle 185.9^\circ \text{ A}$
 (b) Switch one of the dots in the circuit of Figure 4. Find I_1 and I_2 again. Ans: $I_1 = 0.576 \angle -17.1^\circ \text{ A}$, $I_2 = 0.288 \angle -17.1^\circ \text{ A}$.

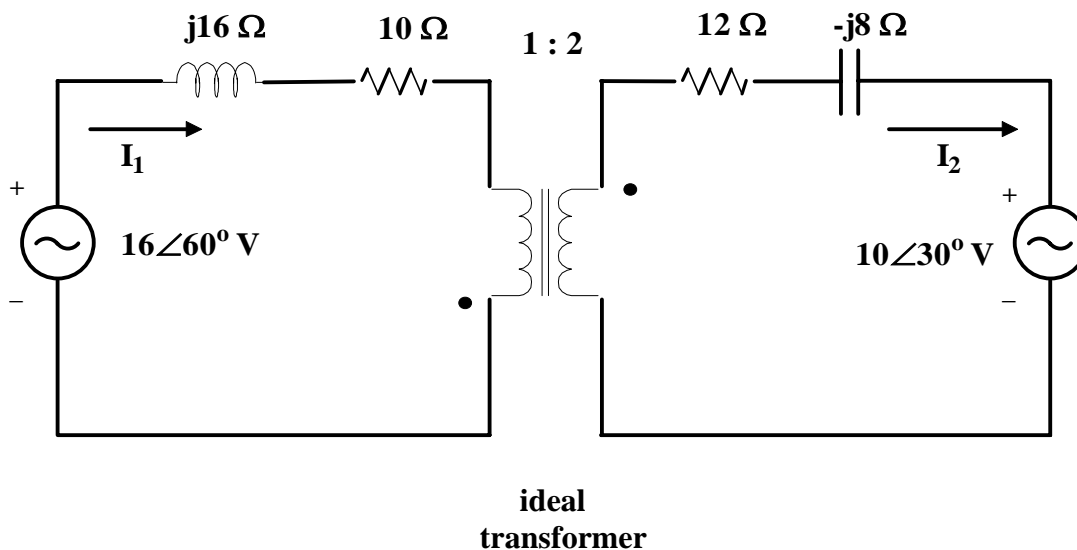


Figure 4: Circuit for problem 4.

(5) A transformer is used to match an amplifier with an $8\ \Omega$ speaker load as shown in Figure 5. The Thevenin equivalent of the amplifier is $V_{Th} = 10\ \text{V}$, $Z_{Th} = 128\ \Omega$.

- (a) Find the required turns ratio for the maximum energy power transfer to the speaker.
Ans: $n = 0.25$
- (b) Determine the primary and secondary currents. $I_1 = 39.06\ \text{mA}$, $I_2 = 4xI_1$
- (c) Calculate the primary and secondary voltages. $V_1 = 5\ \text{V}$, $V_2 = 1.25\ \text{V}$

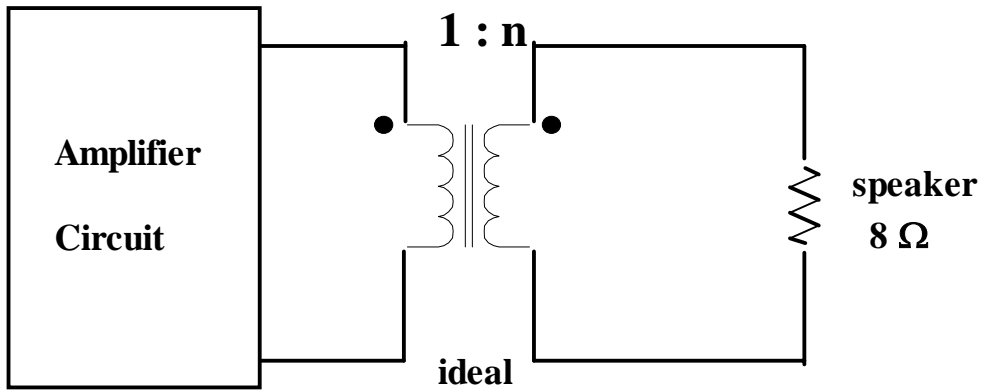


Figure 5: Diagram for problem 5.