

Name:

ID :

PRINCIPLES OF EE1

Homework #6 - Group 02

Submission deadline: December 31, 2020.

IMPORTANT: You should hand in a copy of your report that contains a full and detailed description of all the work done on the homework. Marks will be deducted if there are sign of violation of regulation and late submission (20% for each day). You should print out this document and write down your solution directly on it.

Tip: You should draw a bounding box for your final answer. Ex: $I = 2 + 4 = \boxed{6 A}$

Problem 1: (25 marks) A television receiver uses a cable to connect the antenna to the TV, as shown in Fig.1, with $v_s = 4\cos\omega t$ mV. The TV station is received at 52 MHz. Determine the average power delivered to each TV set if:

- a) the load impedance is $Z = 300 \Omega$;
- b) two identical TV sets are connected in parallel with $Z = 300 \Omega$ for each set.

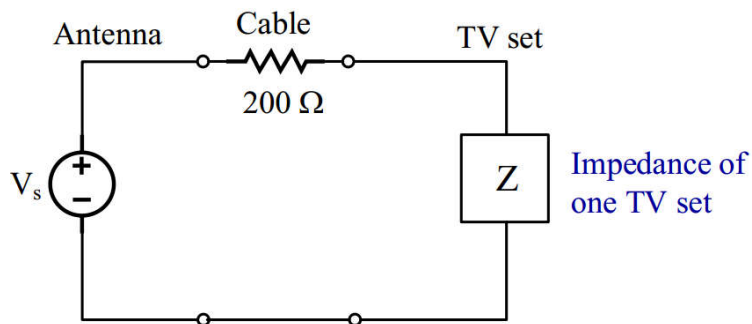


Fig. 1

Solution:

Problem 2: (25 marks)

Given $R_1 = 0.1\Omega$, $\omega L_1 = 0.8\Omega$, $R_2 = 24\Omega$, $\omega L_2 = 32\Omega$ and $V_L = 240 + j0V$.

- Calculate the phasor voltage V_s .
- Connect a capacitor C in parallel with the inductor L_2 , hold V_L constant, and adjust the capacitor until the magnitude of I is a minimum. What is the capacitive reactance? What is the value of V_s ?

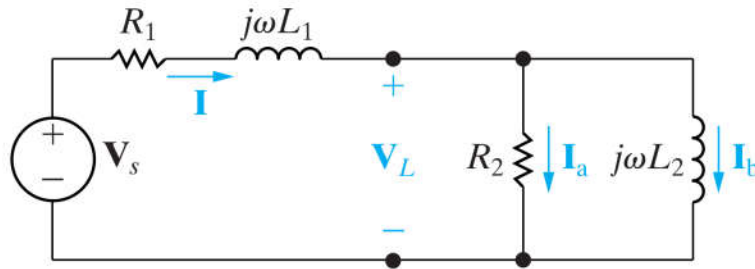


Fig.2

Solution:

Problem 3: (25 marks)

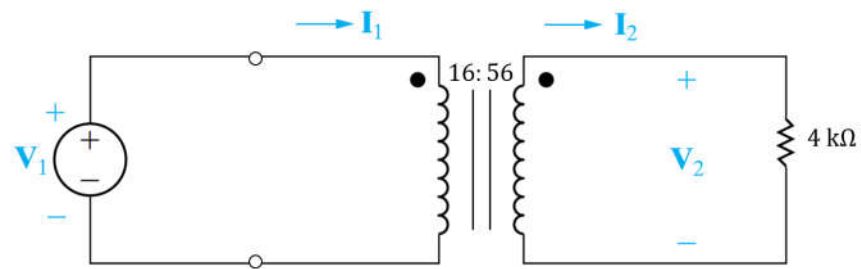


Fig. 3

Assume the transformer is ideal and $|I_2| = 7\text{ mA}$ and $R_L = 4\text{ k}\Omega$. Find:

a/ V_1, V_2

b/ I_1

c/ P_{in} (average) and P_{out} (average).

Solution:

Problem 4: (25 marks)

Find the average power absorbed by the resistor 10-ohm in the given circuit of Fig.4.

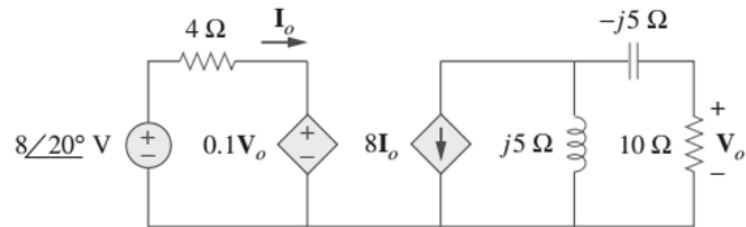


Fig.4

Solution: