

Sultan Qaboos University
College of Engineering
Electrical and Electronics Engineering Department

Quiz #3 With Typical Answer

Course Code : Electric Circuits II
Course Code : ELEC3122
Semester : Summer 2000

Instructor : Dr. Adel Gastli
Date : Tue. 3-07-2000
Time : 20 min

Student name:

Marks

Student ID No.:

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100

Questions

Determine the **h** parameters for the network of Fig. 1.

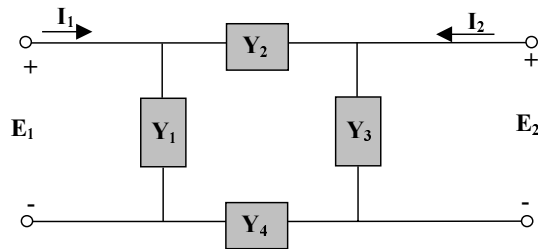


Fig. 1

Answers

$$\bar{E}_1 = h_{11}\bar{I}_1 + h_{12}\bar{E}_2$$

$$\bar{I}_2 = h_{21}\bar{I}_1 + h_{22}\bar{E}_2$$

$$h_{11} = \left. \frac{\bar{E}_1}{\bar{I}_1} \right|_{\bar{E}_2=0} \Rightarrow h_{11} = \frac{Y_2 + Y_4}{Y_1 Y_2 + Y_1 Y_4 + Y_2 Y_4} \quad (\text{impedance})$$

$$h_{12} = \left. \frac{\bar{E}_1}{\bar{E}_2} \right|_{\bar{I}_1=0} \Rightarrow \bar{E}_1 Y_1 = \bar{E}_2 \frac{Y_1 Y_2 Y_4}{Y_1 Y_2 + Y_1 Y_4 + Y_2 Y_4} \Rightarrow h_{12} = \frac{Y_2 Y_4}{Y_1 Y_2 + Y_1 Y_4 + Y_2 Y_4} \quad (\text{ratio})$$

$$h_{21} = \left. \frac{\bar{I}_2}{\bar{I}_1} \right|_{\bar{E}_2=0} \Rightarrow \bar{I}_1 = \bar{E}_1 \left(Y_1 + \frac{Y_2 Y_4}{Y_2 + Y_4} \right) \Rightarrow \bar{I}_2 = -\bar{E}_1 \left(\frac{Y_2 Y_4}{Y_2 + Y_4} \right) \Rightarrow h_{21} = -\frac{Y_2 Y_4}{Y_1 Y_2 + Y_1 Y_4 + Y_2 Y_4} \quad (\text{ratio})$$

$$h_{22} = \left. \frac{\bar{I}_2}{\bar{E}_2} \right|_{\bar{I}_1=0} \Rightarrow h_{22} = Y_3 + \frac{Y_1 Y_2 Y_4}{Y_1 Y_2 + Y_1 Y_4 + Y_2 Y_4} \quad (\text{admittance})$$