



$$Z_1 = 1 \Omega$$

$$Z_2 = 1 \Omega$$

$$Z_3 = 1 \Omega$$

$$Z_4 = 2 \Omega$$

$$Z_5 = 2 \Omega$$

$$Z_6 = 1 \Omega$$

$$Z = \frac{1}{Y}$$

$$Y = \frac{1}{Z}$$

$$Z_{456} = Z_4 + Z_5 + Z_6 = j \cdot 2 + 2 - j = 2 + j \text{ [}\Omega\text{]}$$

$$\begin{aligned} Y_{3456} &= Y_3 + Y_{456} = \frac{1}{Z_3} + \frac{1}{Z_{456}} = \frac{1}{1} + \frac{1}{2+j} = \\ &= 1 + \frac{1}{2+j} \cdot \frac{2-j}{2-j} = 1 + \frac{2-j}{4-j \cdot 2 + j \cdot 2 + 1} = 1 + \frac{2-j}{5} = \\ &= 1 + \frac{2}{5} - j \cdot \frac{2}{5} = \frac{7}{5} - j \cdot \frac{2}{5} \text{ [S]} \end{aligned}$$

$$Y_{3456} = \frac{7}{5} - j \cdot \frac{2}{5} \text{ [S]}$$

$$\begin{aligned} Z_{3456} &= \frac{1}{Y_{3456}} = \frac{1}{\frac{7}{5} - j \cdot \frac{2}{5}} = \frac{1}{\frac{7}{5} - j \cdot \frac{2}{5}} \cdot \frac{\frac{7}{5} + j \cdot \frac{2}{5}}{\frac{7}{5} + j \cdot \frac{2}{5}} = \\ &= \frac{\frac{7}{5} + j \cdot \frac{2}{5}}{\frac{49}{25} - j \cdot \frac{14}{25} + j \cdot \frac{14}{25} + \frac{4}{25}} = \frac{\frac{7}{5} + j \cdot \frac{2}{5}}{\frac{53}{25}} = \frac{7}{5} \cdot \frac{25}{53} + j \cdot \frac{2}{5} \cdot \frac{25}{53} = \\ &= \frac{175}{265} + j \cdot \frac{50}{265} \text{ [}\Omega\text{]} \end{aligned}$$

$$\begin{aligned} Z_{AB} &= Z_1 + Z_2 + Z_{3456} = j + 1 + \frac{175}{265} + j \cdot \frac{50}{265} = \\ &= \frac{175 + 265}{265} + j \cdot \frac{50 + 265}{265} \end{aligned}$$

$$Z_{AB} = \frac{440}{265} + j \cdot \frac{315}{265} \text{ [}\Omega\text{]}$$

$$|Z_{AB}| = \sqrt{\left(\frac{440}{265}\right)^2 + \left(\frac{315}{265}\right)^2}$$