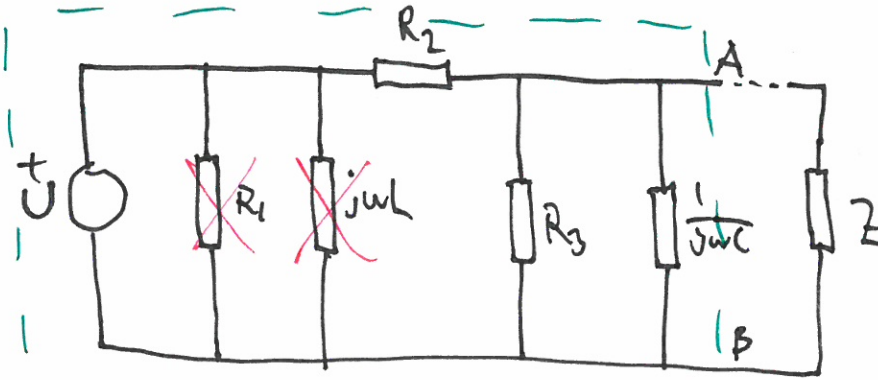


3.1) Effekt anpassning:

Komplex schema:



$$R_2 = 1.0 \Omega$$

$$R_3 = 1.0 \Omega$$

$$\frac{1}{\omega C} = 0.5 \Omega$$

$$U = 10\sqrt{2} \text{ V}$$

Ersätt med ekv. tvåpol

Beräkna inre impedansen Z_i :

$$Z_i = R_2 \parallel R_3 \parallel \frac{1}{j\omega C} = \frac{R_2 \cdot R_3 \cdot \frac{1}{j\omega C}}{R_2 \cdot \frac{1}{j\omega C} + R_3 \cdot \frac{1}{j\omega C} + R_2 \cdot R_3} = \frac{R_2 \cdot R_3}{R_2 + R_3 + j\omega R_2 R_3 C}$$

$$= \frac{1 \cdot 1}{1 + 1 + j \cdot 1 \cdot 1 \cdot 2} = \frac{1}{2 + j2} = \frac{(2 - j2)}{2^2 + 2^2} = 0.25 - 0.25j \Omega$$

Beräkna tomgångsspänningen U_{AB0} :

Spänningsdelning:

$$U_{AB0} = U \cdot \frac{R_3 \parallel \frac{1}{j\omega C}}{R_3 \parallel \frac{1}{j\omega C} + R_2}$$

$$= 10\sqrt{2} \cdot \frac{0.2 - j \cdot 0.4}{1.2 - j \cdot 0.4}$$

$$R_3 \parallel \frac{1}{j\omega C} = \frac{R_3 \cdot \frac{1}{j\omega C}}{R_3 + \frac{1}{j\omega C}} = \frac{R_3}{1 + j\omega R_3 C}$$

$$= \frac{1}{1 + j \cdot 2} = \frac{1 - j \cdot 2}{1 + 4} = 0.2 - j \cdot 0.4 \Omega$$

$$= 10\sqrt{2} \cdot \frac{(0.2 - j \cdot 0.4)(1.2 + j \cdot 0.4)}{1.2^2 + 0.4^2} = 10\sqrt{2} \cdot (0.25 - j \cdot 0.2) = 2.5\sqrt{2} - j \cdot 2.5\sqrt{2}$$

$$= 5 \cdot e^{-j \cdot \pi/4} \text{ V}$$

$$P_{\max} \text{ när } Z = Z_i^* \Rightarrow \boxed{Z = 0.25 + 0.25j \Omega}$$

$$P_{\max} = \frac{\left(\frac{U_{AB0}}{\sqrt{2}}\right)^2}{4 \cdot \text{Re}\{Z\}} = \frac{5^2}{4 \cdot 0.25} = \boxed{12.5 \text{ W}}$$