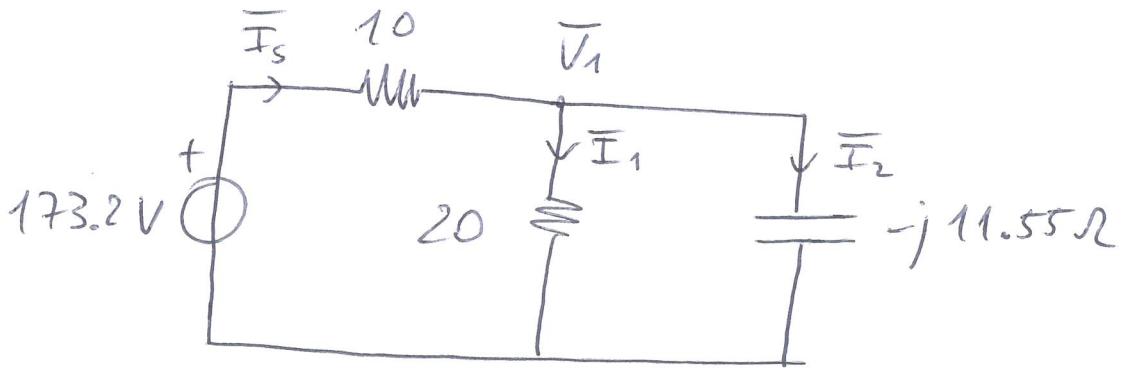


AC REGIME 1

4)



$$\bar{V}_1 = \frac{173.2}{\frac{1}{10} + \frac{1}{20} + \frac{1}{-j11.55}} \text{ V}$$

$$\bar{V}_1 = 86.6 - 50j = 100 e^{-j\frac{\pi}{6}} \text{ V}$$

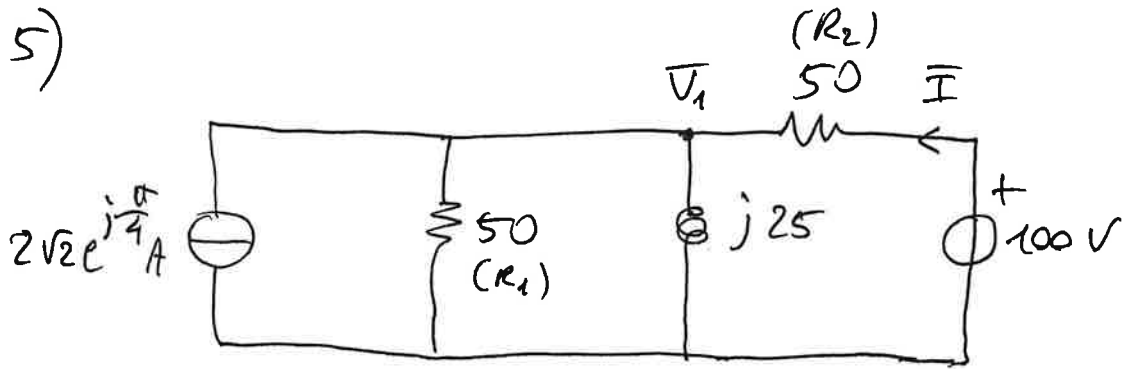
$$\bar{I}_s = \frac{\bar{V}_s - \bar{V}_1}{10} = 10 e^{j\frac{\pi}{6}} \text{ A}$$

$$\bar{I}_1 = 5 e^{-j\frac{\pi}{6}} \text{ A}$$

$$\bar{I}_2 = 8.66 e^{+j\frac{\pi}{3}} \text{ A}$$

AC REGIME 1

5)



$$\bar{V}_1 = \frac{2\sqrt{2}e^{j\frac{\pi}{4}} + \frac{100}{50}}{\frac{1}{50} + \frac{1}{j25} + \frac{1}{50}} \text{ V}$$

$$\bar{V}_1 = 25 + j75 \text{ V}$$

$$\bar{I} = \frac{100 - \bar{V}_1}{50} = 1.5 - 1.5j \text{ A}$$

$$P_{R1} = \frac{|\bar{V}_1|^2}{50} = 125 \text{ W}$$

$$P_{R2} = 50 |\bar{I}|^2 = 225 \text{ W}$$

$$Q_L = \frac{|\bar{V}_1|^2}{\omega L} = \frac{|\bar{V}_1|^2}{25} = 250 \text{ VAR}$$

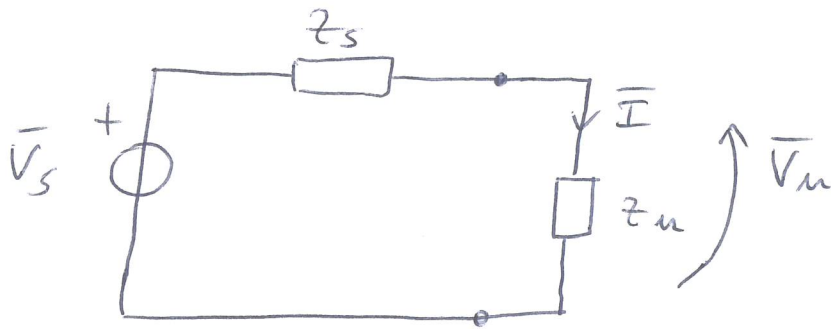
$$P_{CVS} = 100 \cdot \bar{I}^* = 150 + j150 \text{ VA}$$

$$P_{CIS} = \bar{V}_1 \cdot (2\sqrt{2}e^{j\frac{\pi}{4}})^* = 200 + 100j \text{ VA}$$

$$\begin{cases} P_{VS} + P_{IS} = P_{R1} + P_{R2} \\ Q_{VS} + Q_{IS} = Q_L \end{cases}$$

AC REGIME 1

6)



$$z_s = R_s + jX_s ; R_s > 0$$

$$z_n = R_n + jX_n ; R_n > 0$$

$$P_n = R_n |\bar{I}|^2$$

$$\bar{I} = \frac{\bar{V}_s}{z_s + z_n} \quad |\bar{I}|^2 = \frac{|\bar{V}_s|^2}{(R_s + R_n)^2 + (X_s + X_n)^2}$$

$$P_n = |\bar{V}_s|^2 \frac{R_n}{(R_s + R_n)^2 + (X_s + X_n)^2}$$

$$\underline{X_n = -X_s} \Rightarrow P_n = |\bar{V}_s|^2 \frac{R_n}{(R_s + R_n)^2}$$

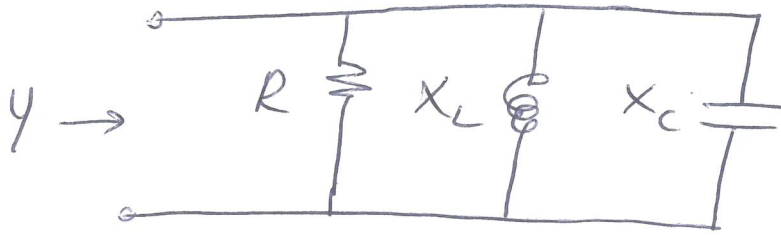
$$\frac{dP_n}{dR_n} = 0 \Rightarrow \underline{R_n = R_s}$$

$$\boxed{z_n = z_s^*}$$

$$P_{\text{dizp}} = \max_{z_n} P_n = \frac{|\bar{V}_s|^2}{4R_s}$$

AC REGIME 1

7)



$$R = 2.5 \Omega$$

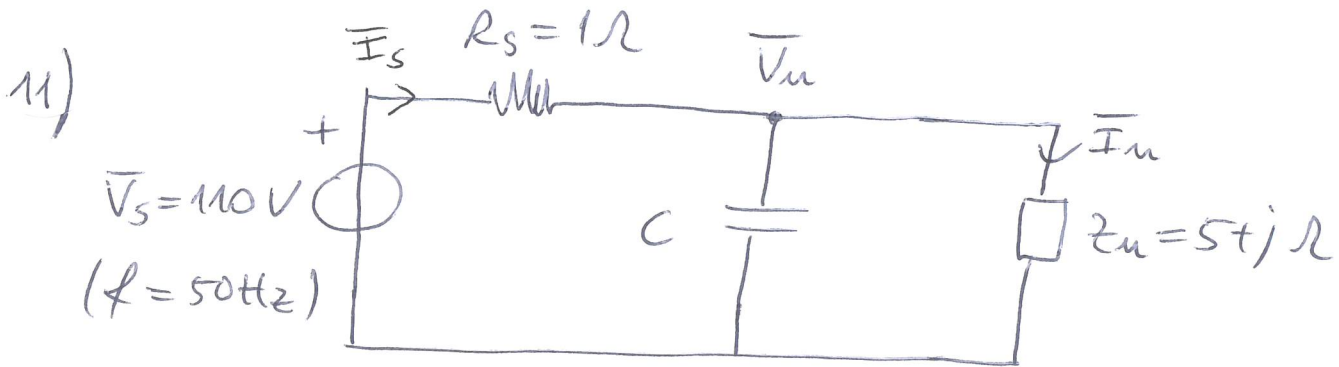
$$X_L = 4 \Omega$$

$$X_C = -10 \Omega$$

$$Y = \frac{1}{R} - j \frac{1}{X_L} - \frac{j}{X_C}$$

$$= 0.4 - j0.25 + j0.1 = 0.4 - 0.15j \text{ S}$$

AC REGIME 1



$$Y_n = \frac{1}{Z_n} = 0.1923 - j0.0385 \text{ S}$$

$$j\omega C - j0.0385 = 0$$

$$C = \frac{0.0385}{2\pi f} = 122 \mu\text{F}$$

$$Y_p = Y_n + j\omega C = 0.1923 \text{ S}$$

$$Z_p = 5.2 \Omega$$

$$\bar{V}_n = \frac{Z_p}{Z_p + 1} \bar{V}_s = 92 \text{ V}$$

$$\bar{I}_n = \frac{\bar{V}_n}{Z_n} = 17.7 - 3.5j = 18 e^{-j0.197} \text{ A}$$

$$\bar{I}_s = 18 \text{ A}$$

$$P_{cn} = Z_n |\bar{I}_n|^2 = \underbrace{1628}_{P[\text{W}]} + j \underbrace{326}_{Q[\text{VAR}]} \text{ VA}$$

$$P_{cc} = -j\omega C |\bar{V}_n|^2 = -j 324 \text{ VAR}$$

$$P_{cs} = 110 \bar{I}_s^* = 110 \cdot 18 = 1980 \text{ W (NON-NORM.)}$$

$$P_{cr} = R_s |\bar{I}_s|^2 = 324 \text{ W}$$