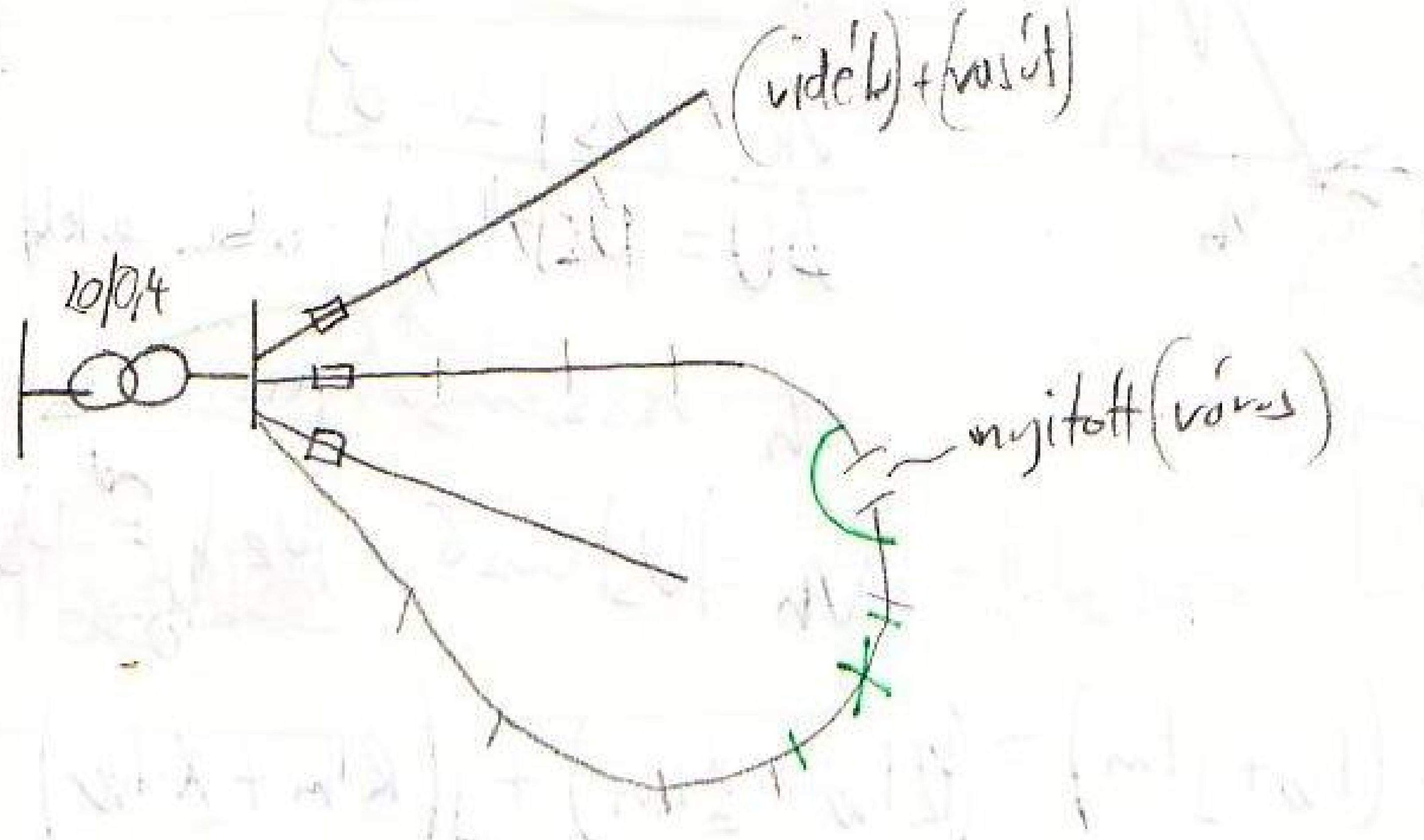
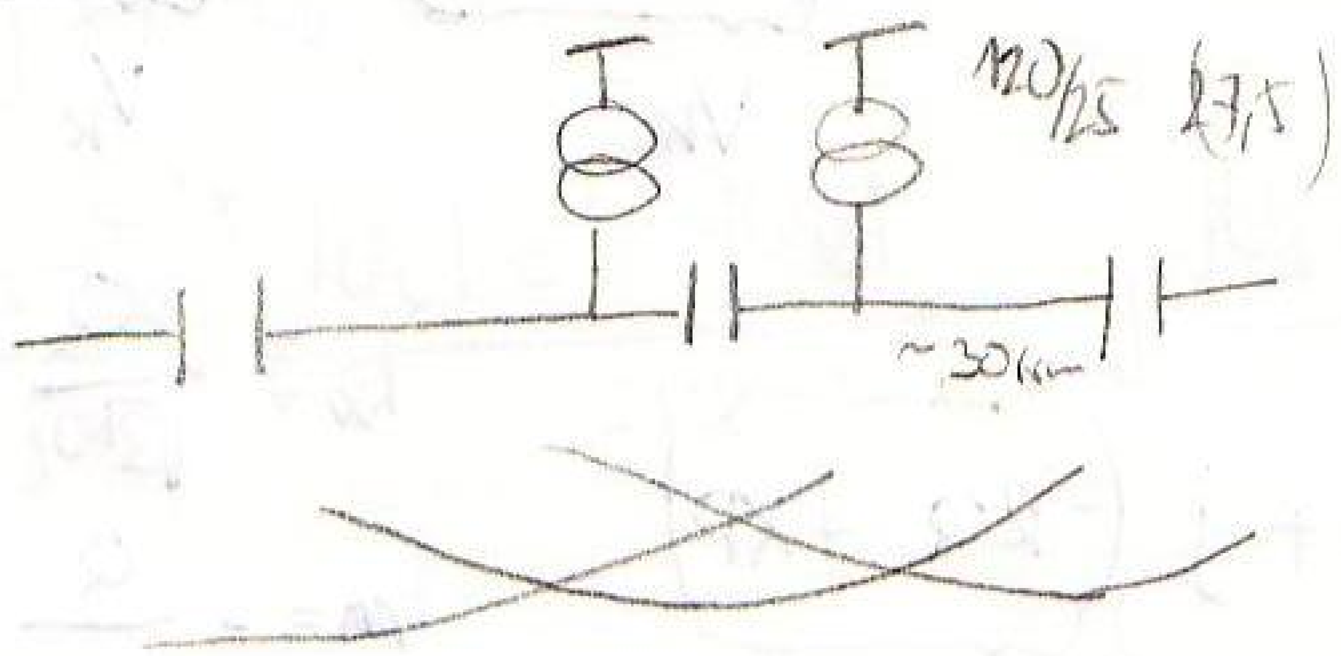
2007.04.03. kedd

XIV Előadás (8. hét)

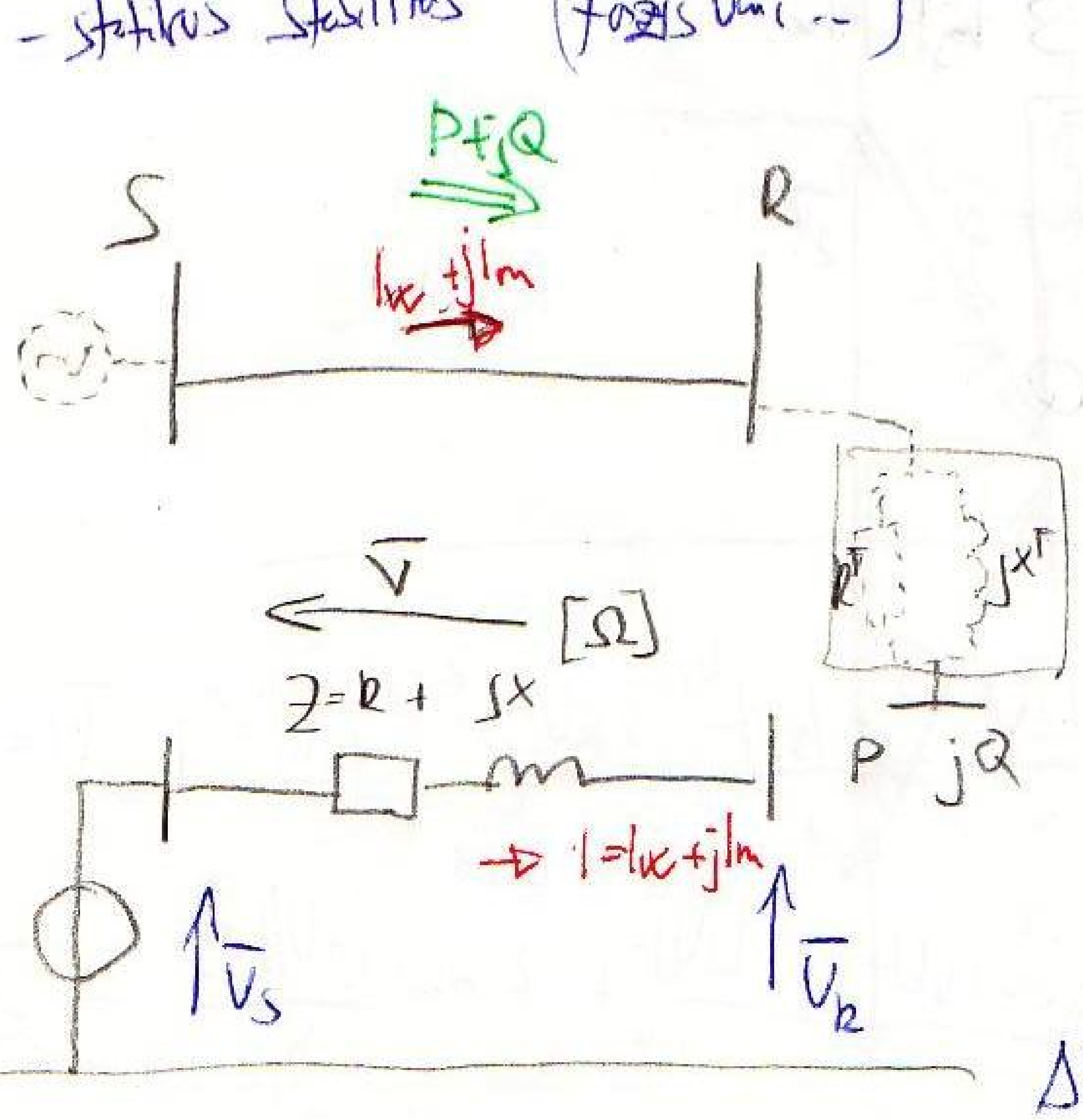
Sugaras ág feszültségesése

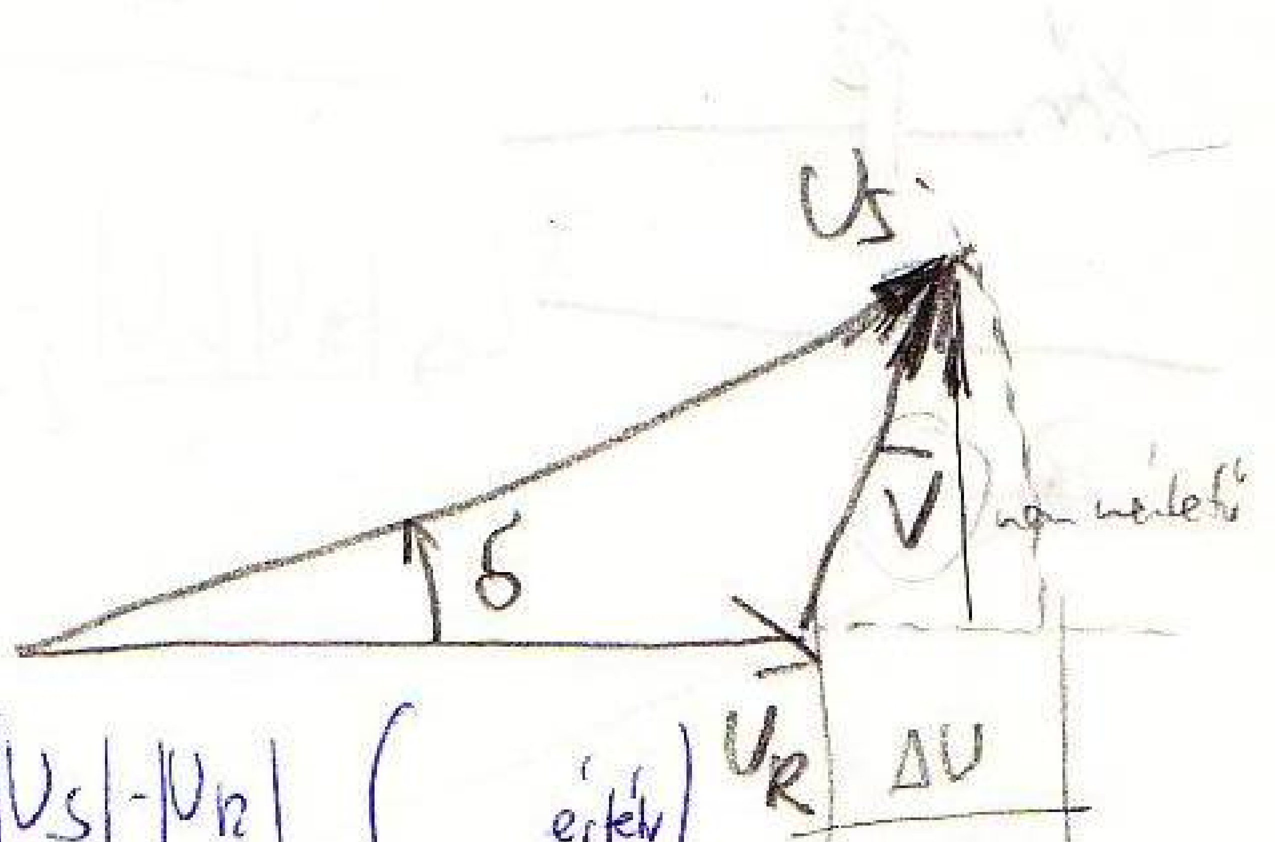




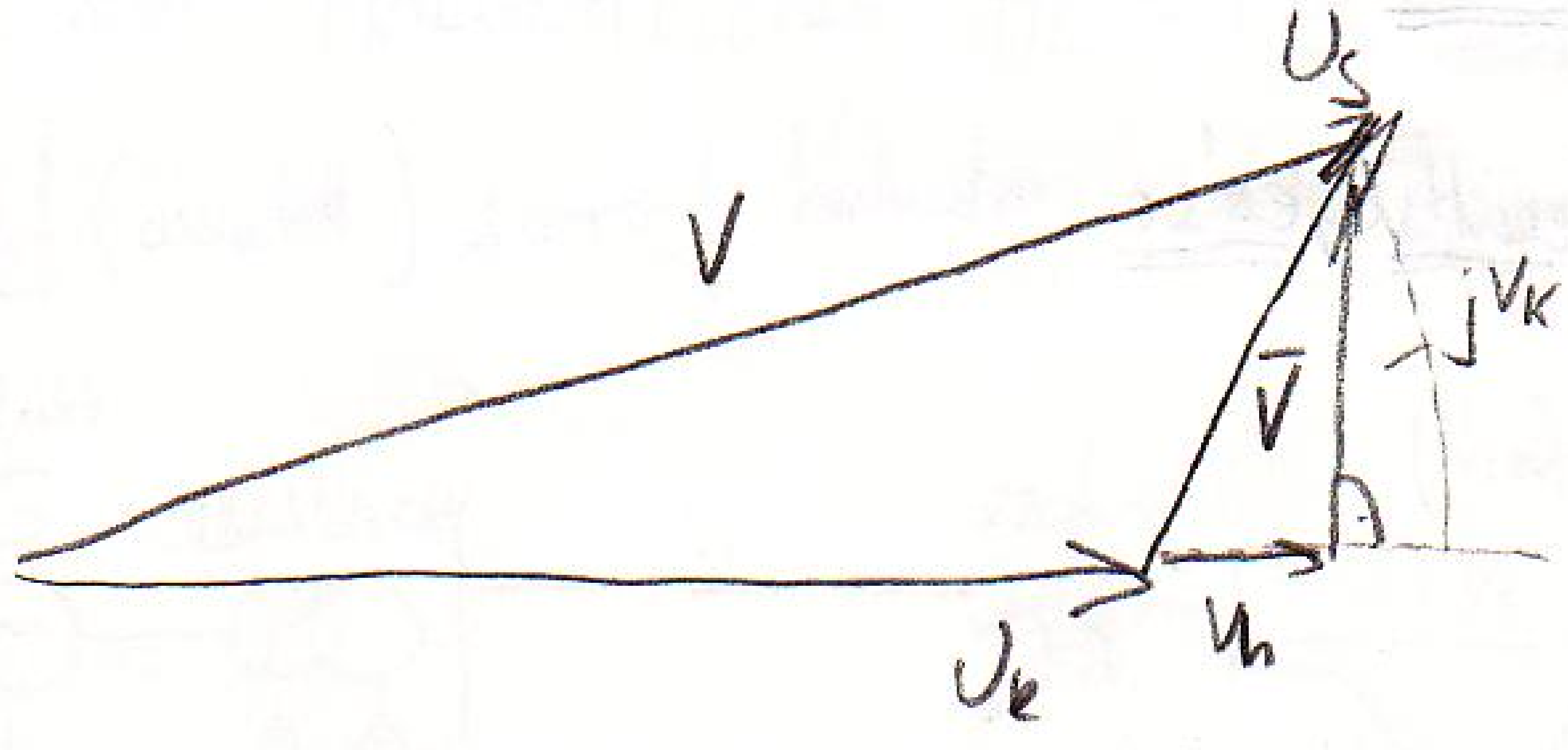
Átviteli határok

- termikus határ (kisfesz, középfesz kábel.) 90°C tartós, 250°C zárlat
- fesz esés (vasútvonal 27,5kV helyett pl 19,5kV + hop ⇒ lekapcsol a főmegszakító)
- statikus stabilitás (fázisszög...)





$\Delta U = |U_S| - |U_R|$ (érték)



$\bar V$ komplex (fázisos) fesz.esés

V_K: keresztirányú fesz.

$\boxed{V_K = |U_S| \sin\delta}$

$\Delta U = |U_S| - |U_R|$ (absz. érték)

V_h: hosszirányú fesz.

$V_h = |U_S|\cos\delta - |U_R| \overset{\sim}{=} |U_S| - |U_R|$ $|_{\delta \to 0}$

$\bar U_S - \bar Z \bar I - \bar U_R = 0$ $\boxed{U_h \approx \Delta U}$

$$\bar U = \bar U_S - \bar U_R = \bar Z \cdot I = (R + jX)(I_w + jI_m) = \underbrace{(RI_w - XI_m)}_{V_h} + j\underbrace{(RI_m + X \cdot I_w)}_{V_K}$$

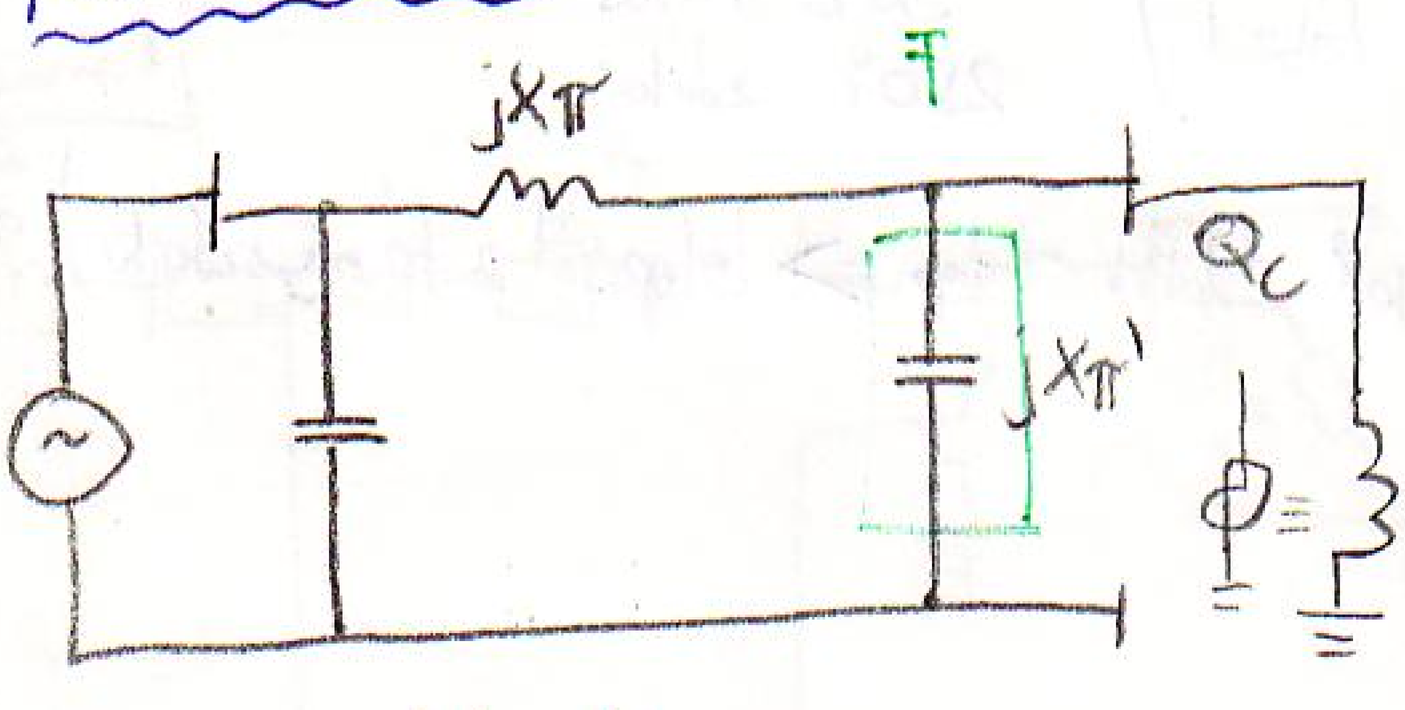
ha $X >> R$

$$= \frac{1}{\sqrt{3}U}\Big[\Big(\underbrace{RP + XQ}_{V_h}\Big) + j\Big(\underbrace{-RQ + XP}_{V_K}\Big)$$

$I_w = \frac{Q}{\sqrt{3}U}$

$I_m = -\frac{Q}{\sqrt{3}U}$

Ferranti hatás

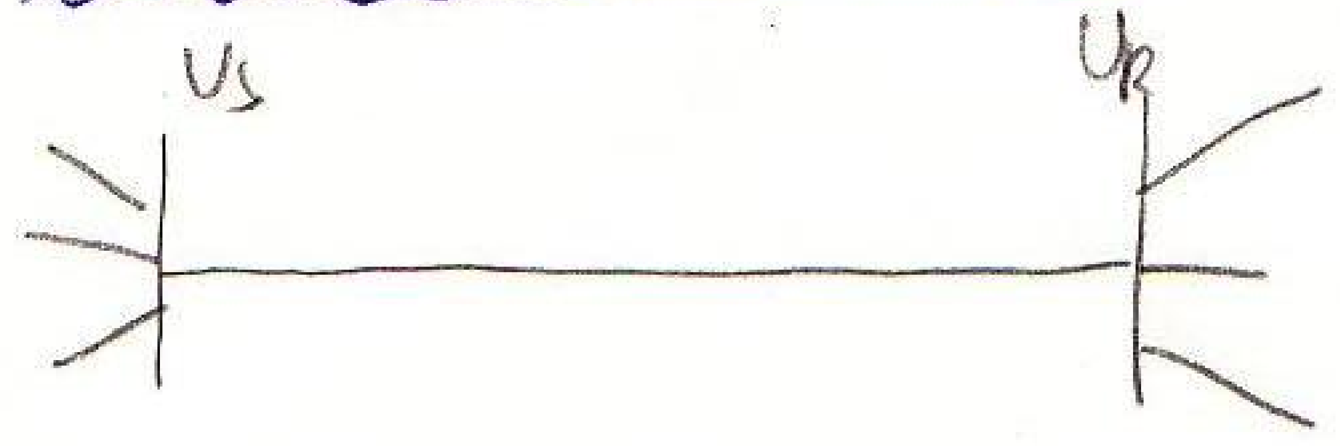


$$V_h = \underbrace{\frac{1}{\sqrt{3}U} X_\pi \cdot Q_C}_{\sim U_h}$$ 150 Mvar

$V_h = X_\pi \cdot$

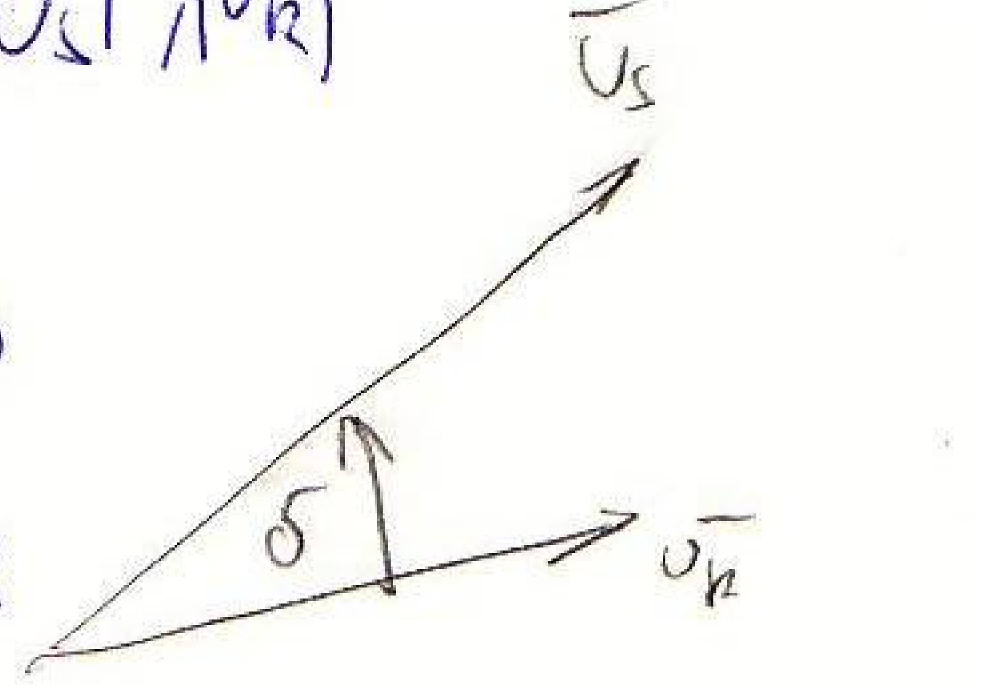
$$U_h = \frac{1}{\sqrt{3}U} XQ = \frac{1}{\sqrt{3}}\Big(\underbrace{x_L^V - x_C^S}_{0,1}\Big) \cdot Q$$

Hurokág teljesítés viszonya



előírt $|U_s|, |U_R|$

$\delta \Rightarrow \begin{cases} P \\ Q \end{cases}$



$\uparrow \bar U_s = |U_s|\angle\delta$ $\quad\quad$ $\bar U_R = |U_R|\angle 0$

$$\bar U_s - jX\bar I - \bar U_R = 0$$

$$I^* = \left(\frac{\bar U_s - \bar U_R}{jX}\right)^* = \frac{|U_s|e^{-j\delta} - |U_R|}{-jX} = j\frac{|U_s|e^{-j\delta} - |U_R|}{X}$$

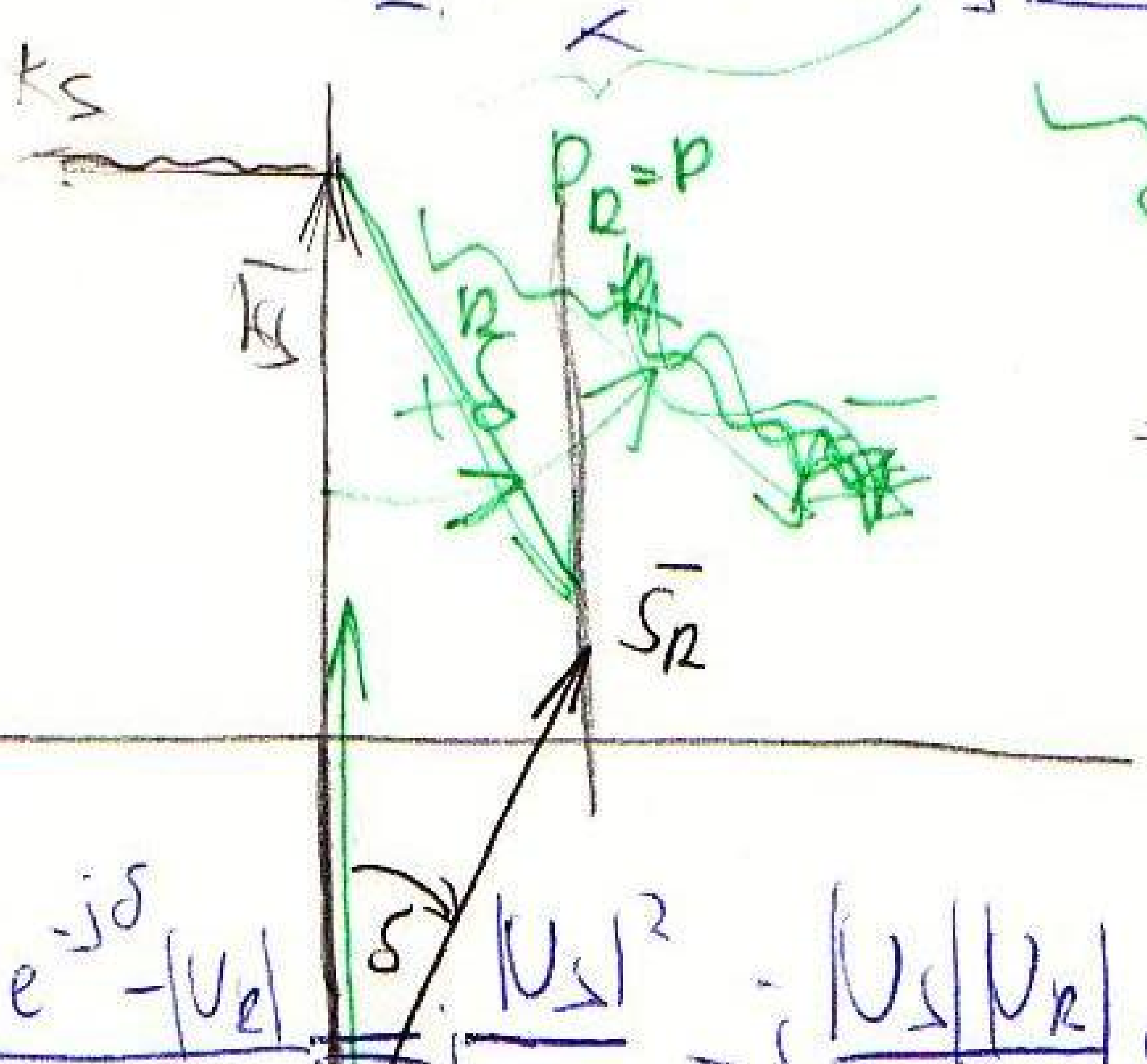
"R" telj

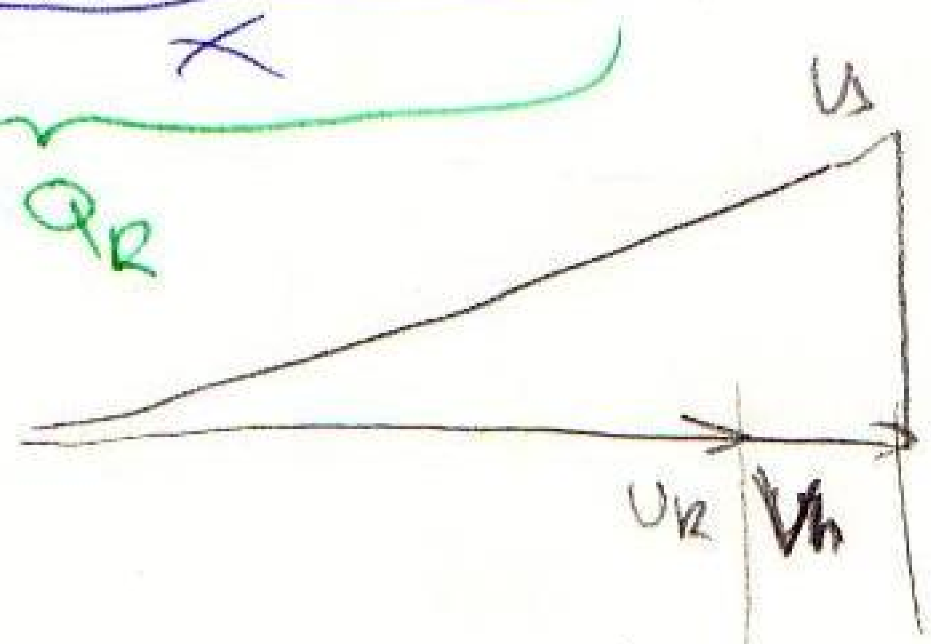
$$\bar S_R = \bar U_R \cdot \bar I^* = j\frac{|U_s||U_R|e^{-j\delta} - |U_R|^2}{X} = \underbrace{-j\frac{|U_R|^2}{X}}_{K_R} + \underbrace{j\frac{|U_s|\cdot|U_R|}{X}\cdot e^{-j\delta}}_{\text{Sugárvektor}}$$

$$\frac{|U_R||U_s|\cos\delta - j|U_s||U_R|\sin\delta}{X}$$

$$= j\frac{|U_s||U_R|\cos\delta - j|U_s||U_R|\sin\delta - |U_R|^2}{X} =$$

$$= \underbrace{\frac{|U_s||U_R|}{X}\sin\delta}_{} + j\underbrace{\frac{|U_R|\left(|U_s|\cos\delta - |U_R|\right)}{X}}_{Q_R}$$





$$\bar S_s = \bar U_s I^* = |U_s|e^{+j\delta}\, j\frac{|U_s|e^{-j\delta} - |U_R|}{X} = \underbrace{j\frac{|U_s|^2}{X}}_{K_S} - \underbrace{j\frac{|U_s||U_R|}{X}}_{R}e^{j\delta}$$

$$\bar S_s = \underbrace{\frac{|U_s||U_R|}{X}\sin\delta}_{P_S = P} + j\underbrace{\frac{|U_s|\left(U_s - U_R\cos\delta\right)}{X}}_{Q_S}$$