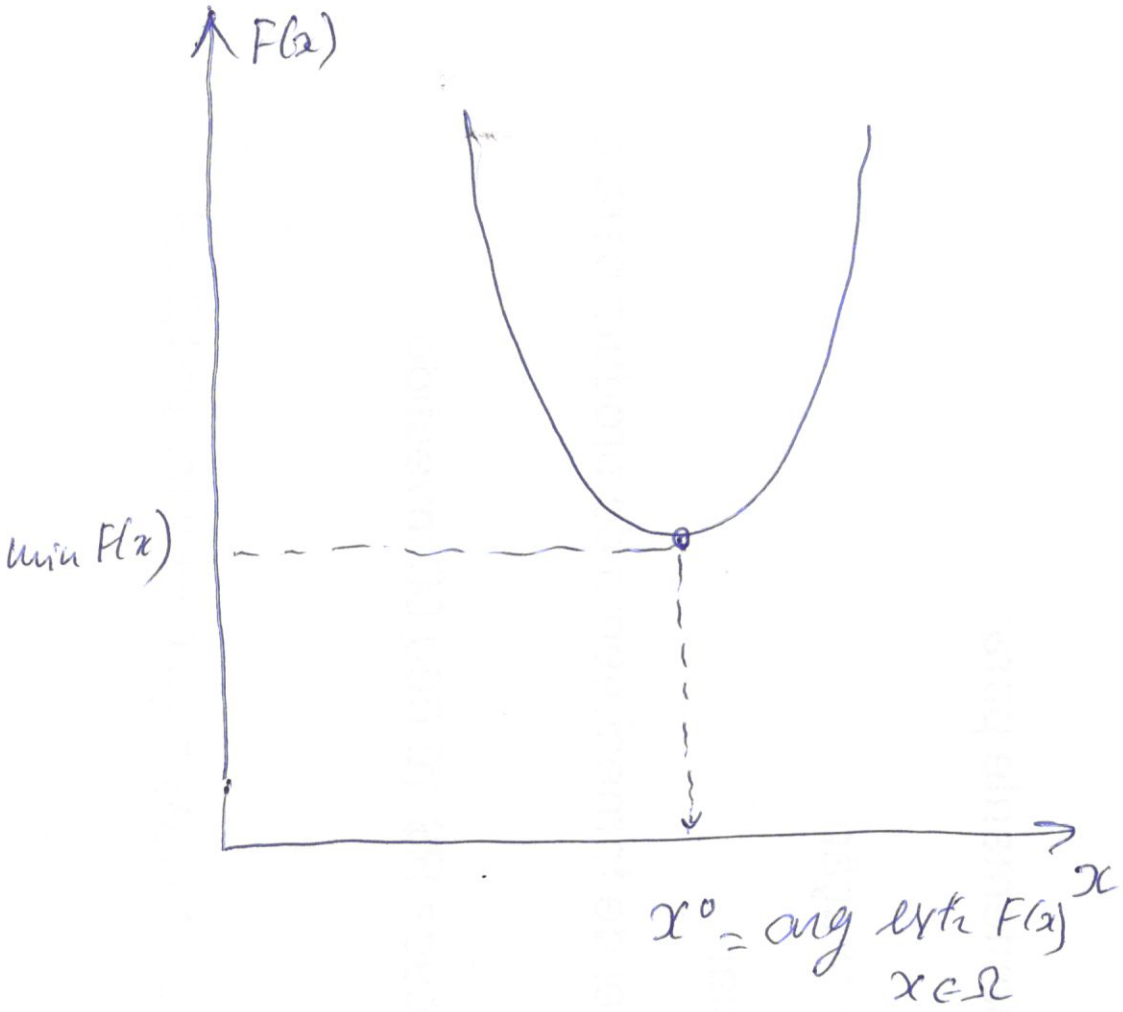
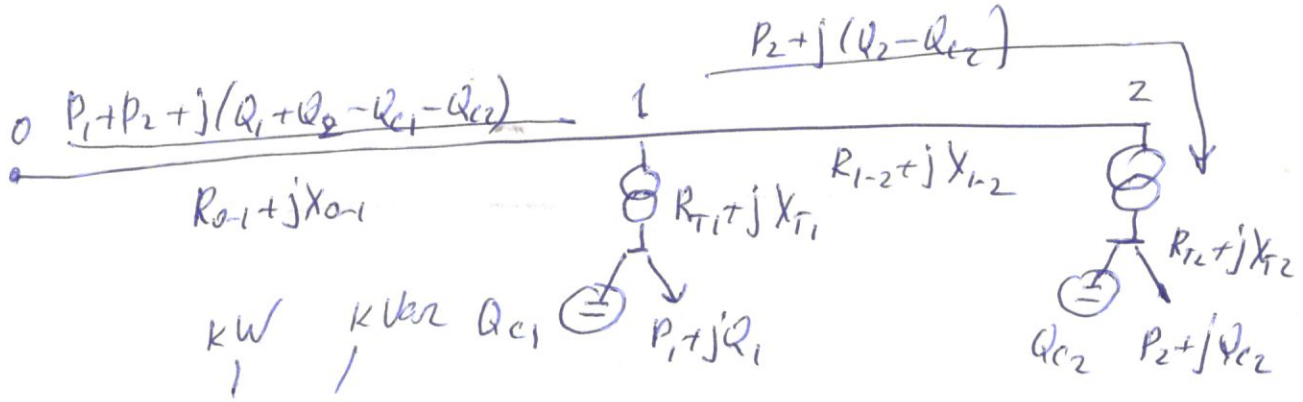

F(x)
min F(x)
x
$x^0 = \arg\min_{x \in \Omega} F(x)$

Exemplo:



kW kVar

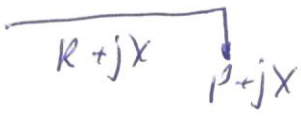
$$kW - \Delta P = \frac{P^2+Q^2}{10^3 V^2} R - \Omega \qquad kV$$

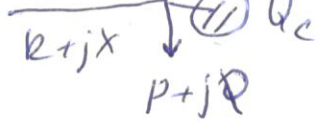
$$\Delta P = \frac{1}{10^3 V^2}\left[(Q_1+Q_2-Q_{c1}-Q_{c2})^2 R_{0-1} + (Q_2-Q_{c2})^2 R_{T1} + (Q_2-Q_{c2})^2 (R_{1-2}+R_{T2})\right]$$

kW Ω kVar Ω

$$\% - \Delta V = \frac{PR+QX}{10V^2}$$

kV





$$\Delta V = \frac{PR+QX}{10V^2} \qquad \Delta V' = \frac{PR+(Q-Q_c)X}{10V^2}$$

$$E_c = \Delta V - \Delta V' = \frac{Q_c X}{10V^2}$$

Exemplo:

$$E_{c1}^2 + E_{c2}^2 \geq 5\%$$

$$E_{c1}^2 = \frac{Q_{c1} X_{0-1}}{10 V^2}$$

$$E_{c2}^2 = \frac{Q_{c2} (X_{0-1} + X_{1-2} + X_{T2})}{10 V^2}$$

$$X_{01} Q_{c1} + (X_{0-1} + X_{1-2} + X_{T2}) Q_{c2} \geq 5 \cdot 10 \cdot V^2$$

$$0 \leq Q_{c1} \leq b_1$$

$$0 \leq Q_{c2} \leq b_2$$

$$X_{0-1} Q_{c_1} + (X_{0-1} + X_{1-2} + X_{T2}) Q_{c_2} \geq 5 \cdot 10 V^2$$

$X_{0-1} = 5$

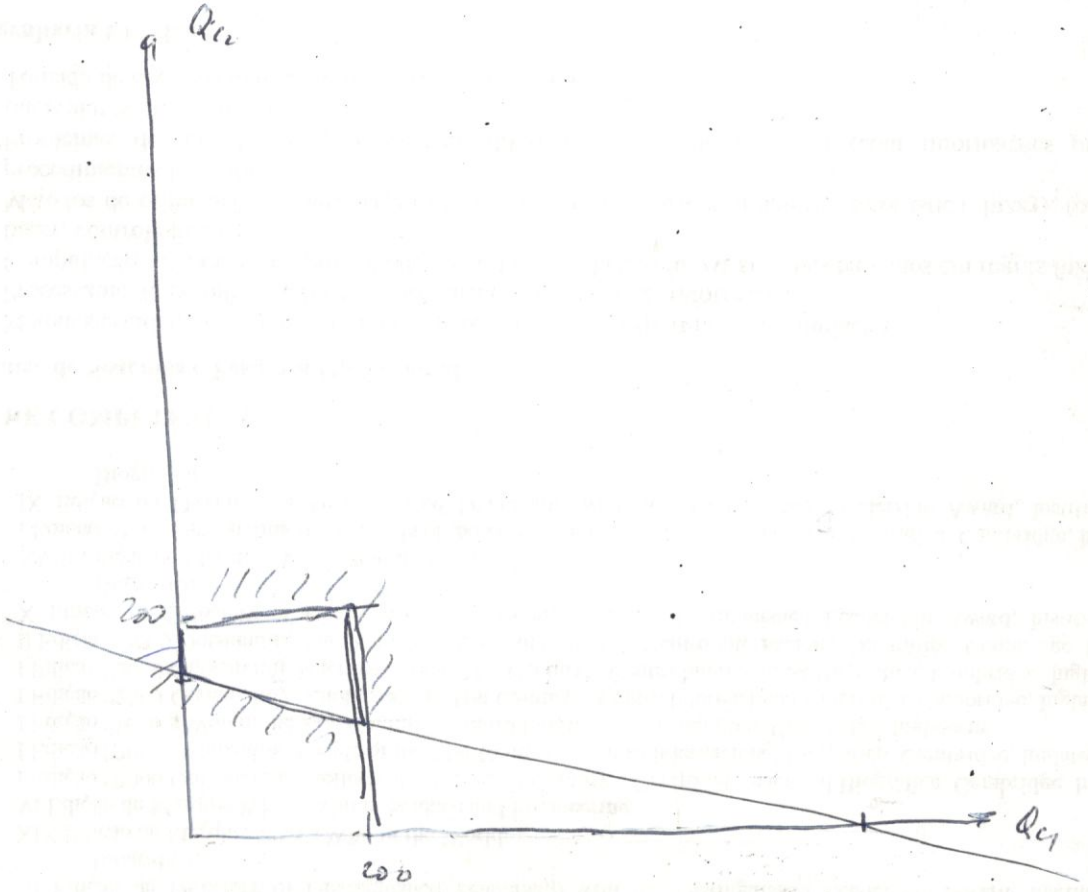
$X_{1-2} = 5$

$X_{T2} = 25$

$$5 Q_{c_1} + 35 Q_{c_2} \geq 5000$$

$0 \leq Q_{c_1} \leq 200$ $\quad Q_{c_1} = 0 \quad Q_{c_2} = 143$

$0 \leq Q_{c_2} \leq 200$ $\quad Q_{c_1} = 1000 \quad Q_{c_2} = 0$



$$50Q_{C1} + 35Q_{C2} \geq 5000$$

$$0 \leq Q_{C1} \leq 200$$

$$0 \leq Q_{C2} \leq 50$$