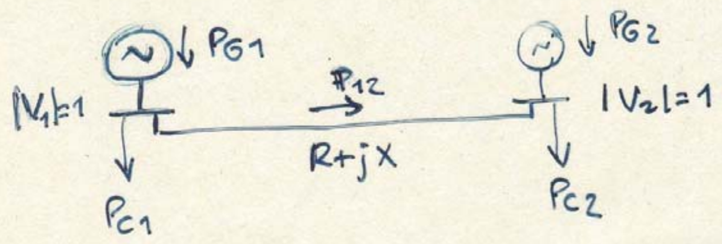
DESPACHO COM PERDAS

RESOLUÇÃO EXACTA (incluindo restrições de linhas)



$$\min \; C_1(P_{G1}) + C_2(P_{G2})$$

suj $P_{G1} - P_{C1} - \frac{1}{Z^2}\left(R \cdot 1^2 + X \cdot 1^2 \,\mathrm{sen}\,\delta - R\cos\delta\right) = 0$

$$P_{G2} - P_{C2} - \frac{1}{Z^2}\left(R - R\cos\delta - X\,\mathrm{sen}\,\delta\right) = 0$$

$$\underbrace{P_{G1} - P_{C1}}_{P_{12}} - P_{Lim} \leq 0$$

$$\mathcal{L} = C_1 + C_2 + \lambda_1(P_{G1} - \dots) + \lambda_2(P_{G2} - \dots) + \mu(P_{G1} - P_{C1} \dots)$$

$$\frac{\partial \mathcal{L}}{\partial P_{G1}} = \frac{\partial C_1}{\partial P_{G1}} + \lambda_1 + \mu = 0 \qquad \frac{\partial \mathcal{L}}{\partial P_{G2}} = \frac{\partial C_2}{\partial P_{G2}} + \lambda = 0$$

$$\frac{\partial \mathcal{L}}{\partial \lambda_1} = \dots \qquad \frac{\partial \mathcal{L}}{\partial \lambda_2} = \dots$$

$$\mu \geq 0 \qquad \mu(P_{G1} - P_{C1} - P_{Lim}) = 0$$

IDEIA: Para cada δ, calcular $P_{G1}, P_{G2}, \lambda_1, \lambda_2$ e μ.
Utilizar o Solver do Excel para obter δ.

EXEMPLO

$R = 0.02$ pu $\qquad C_1 = a + 2\,P_{G1} + 0.5\,P_{G1}^2$

$X = 0.1$ pu $\qquad C_2 = a + 2\,P_{G2} + 0.5\,P_{G2}^2$

$P_{C1} = 1$ pu

$P_{C2} = 3$ pu

A) SEM LIMITE DA LINHA ($\mu = 0$)

$\delta^* = 0.096109 \quad (5^\circ{,}51)$

$P_{G1} = 1.93158$ pu $\qquad \lambda_1 = -3.93158$

$P_{G2} = 2.08617$ pu $\qquad \lambda_2 = -4.08617$

$P_{Loss} = 0.01775$ pu $\qquad (P_{12} = 0.93158)$

$C^* = 2a + 12.077$ \$/h

B) COM LIMITE ($P_{12} \leq 0.9$)

$\delta^* = 0.092872 \quad (5^\circ 32)$

$P_{G1} = 1.9$ pu $\qquad \lambda_1 = -3.96601$

$P_{G2} = 2.11657$ pu $\qquad \lambda_2 = -4.1166$

$P_{Loss} = 0.01657$ pu $\qquad P_{12} = 0.9$ pu

$C^* = 2a + 12.078$ \$/h $\qquad \mu = 0.06601$