KKT in Verbindung mit Trust region

KKT allgemein

$$\mathcal{L}(x, \lambda, \mu) = F(x) + \lambda^T h(x) + \mu^T g(x)$$

a) $\mathcal{L}_x = 0 = F_x(x^*) + h_x^T(x^*) \cdot \lambda^* + g_x^T(x^*) \cdot \mu^*$

b) $\mathcal{L}_\lambda = 0 = h(x^*)$

c) $g(x^*) \leq 0$

d) $g_i(x^*) \cdot \mu_i^* = 0$

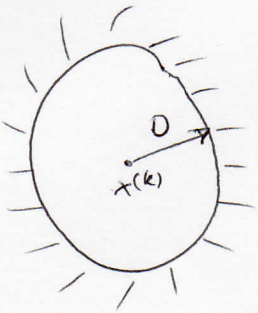
e) $\mu_i^* \geq 0$

Trust region

$$\min \tilde{F}(\Delta x) = \text{quadr. App.} = F(x^k) + F_x(x^k) \cdot \Delta x + \frac{1}{2} \Delta x^T \cdot F_{xx}(x^k) \cdot \Delta x$$

s.t. $|\Delta x| \leq D$

$\Delta x = x^{(k+1)} - x^{(k)}$



UNB

Zusammen

a) $|\Delta x| \leq D \quad |()^2$

$\Delta x^T \cdot \Delta x \leq D^2$

$\Delta x^T \cdot \Delta x - D^2 \leq 0$ ← unsere UNB $g(x)$

$$\tilde{F}_x(x^*) + (\Delta x^T \cdot \Delta x - D^2)_x \cdot \mu^* = 0$$

b) fällt weg, da kein $h(x)$

c) $\Delta x^T \cdot \Delta x - D^2 \leq 0$

d) $(\Delta x^T \cdot \Delta x - D^2) \cdot \mu^* = 0$

e) $\mu^* \geq 0$