Hvis $\mathcal{L}(x)$ er konkav og

$$\frac{\partial \mathcal{L}}{\partial x}(x^*) = 0$$

Så er x^* et maksimumspunkt (3.1.2)

Så gælder, at

$$f(x^*) - \langle \lambda, g(x^*) - b \rangle$$
$$\geq f(x) - \langle \lambda, g(x) - b \rangle$$

for alle tilladte x,

$\lambda = (\lambda_1, \dots, \lambda_m)'$

$g = (g_1, \dots, g_m)$

$$\Rightarrow \quad f(x^*) - f(x) \geq \langle \lambda, g(x^*) - g(x) \rangle$$

Vis: ≥ 0 for alle tilladte x.

$$\langle \lambda, g(x^*) - g(x) \rangle$$
$$= \sum_{j=1}^{m} \lambda_j (g_j(x^*) - g_j(x))$$

Tilfælde 1 : $g_j(x^*) < b_j$

$$\Rightarrow \quad \lambda_j = 0$$

Tilfælde 2 : $g_j(x^*) = b_j$

$$\Rightarrow \lambda_j (g_j(x^*) - g_j(x)) = \lambda_j (b_j - g_j(x))$$
$$\geq 0$$

fordi x er tilladt, dvs.

$$b_j - g_j(x) \geq 0$$
$$\lambda_j \geq 0.$$

$$\Rightarrow \quad f(x^*) - f(x) \geq 0$$

$\square$