Constrained Optimization (CO)

Ch 12 NW

eg. $f(x) = x_1 + x_2$

↳ In UO → $\min_x f(x)$

↳ In CO say $C_1(x) = x_1^2 + x_2^2 - 2 = 0$

$C_2(x) = x_1 + x_2 + 4 \geq 0$

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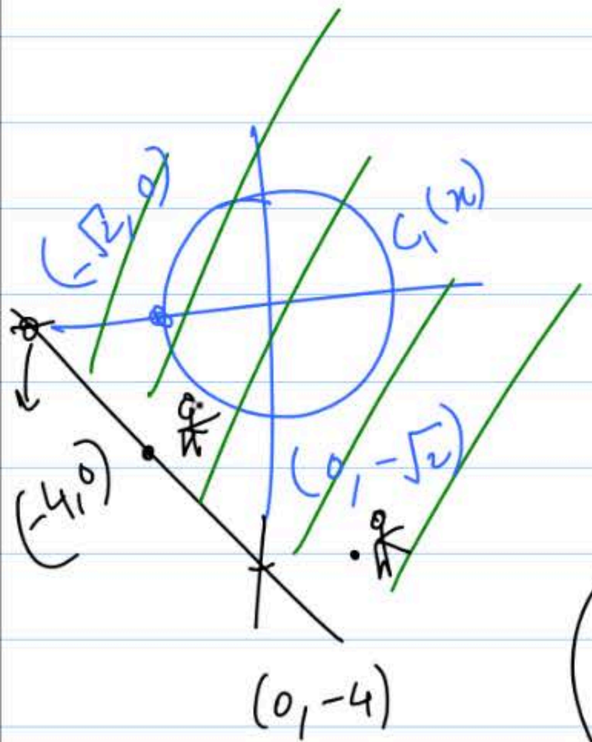
$C_2(x) = x_1 + x_2 + 4 \geq 0$ ← Inequality

$\min_x f(x)$ Subject to s.t.

$$\begin{cases} C_i(x) = 0 \;, & i \in \mathcal{E} \\ C_i(x) \geq 0 \;, & i \in \mathcal{I} \end{cases}$$

→ Convention



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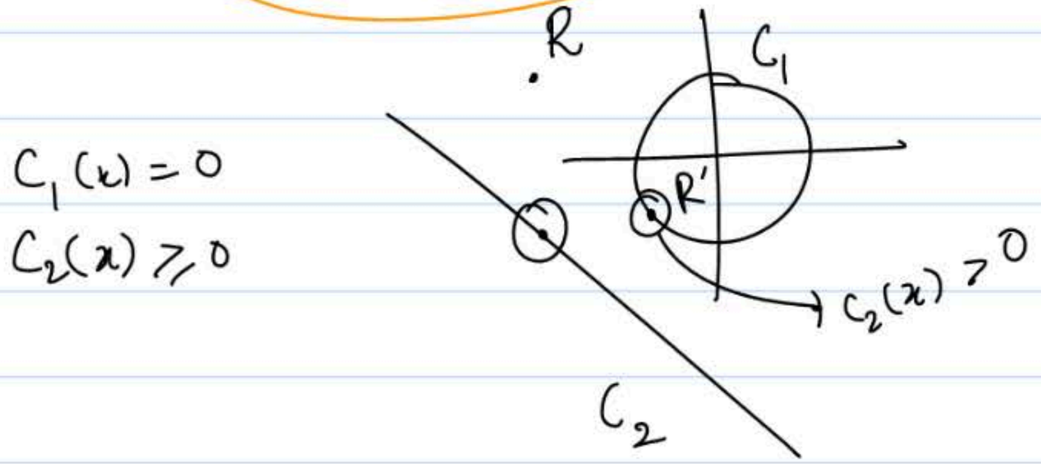
$$\min_x f(x) \quad \text{Subject to (s.t.)} \quad \begin{cases} C_i(x) = 0, & i \in \mathcal{E} \\ C_i(x) \geq 0, & i \in \mathcal{I} \end{cases}$$

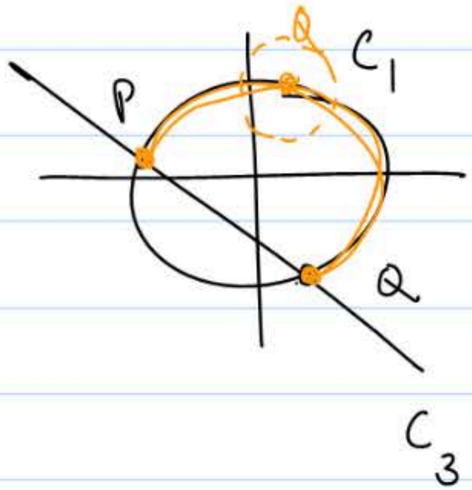
Convention

CO → $\min_{x \in \Omega} f(x)$

Active Set

$$A(x) = \mathcal{E} \cup \{ i \in \mathcal{I} \mid C_i(x) = 0 \}$$





$C_1(x) = 0$

$C_3(x) \geq 0$