



Pesquisa Operacional / Programação Matemática

Método Simplex: resolução gráfica



Resolução gráfica

- Viável apenas para problemas (muito) pequenos.
- Visualização.
- Ex.:

$$\text{Maximizar } f(x_1, x_2) = x_1 + 2x_2$$

$$x_1 + x_2 \leq 4$$

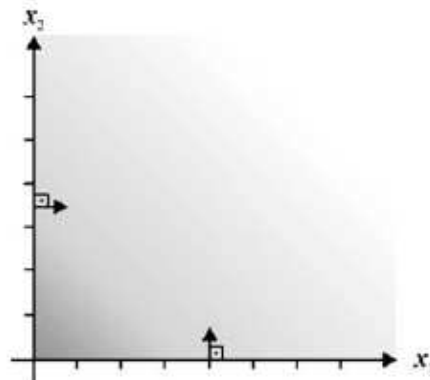
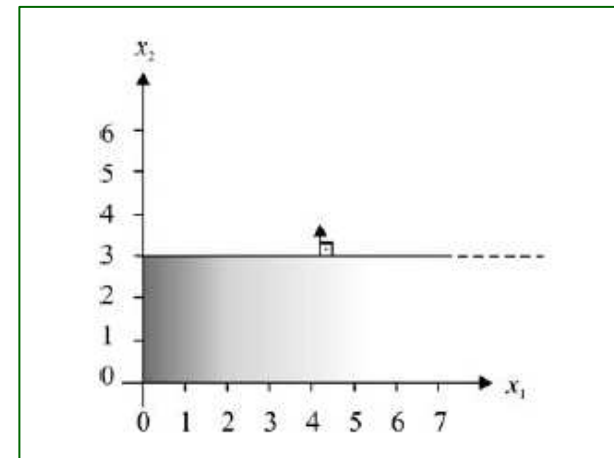
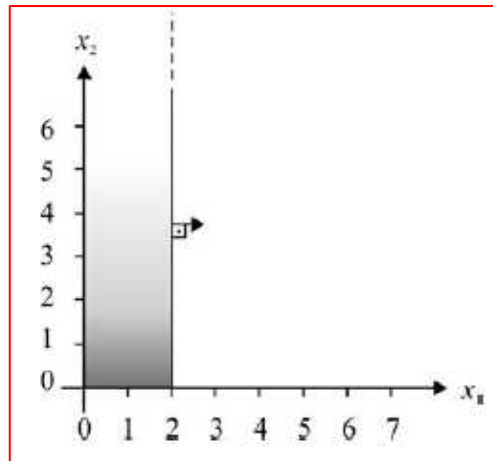
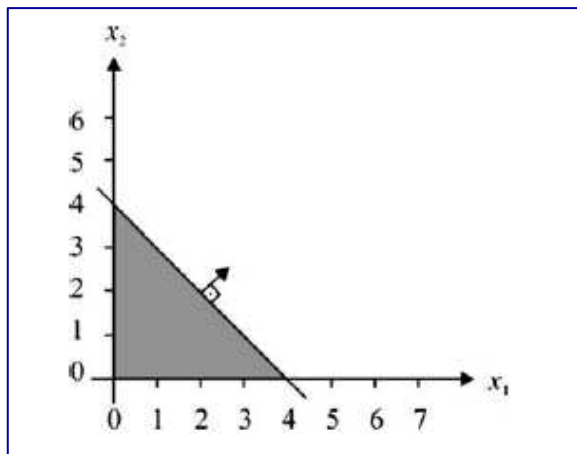
$$x_1 \leq 2$$

$$x_2 \leq 3$$

$$x_1 \geq 0, x_2 \geq 0.$$

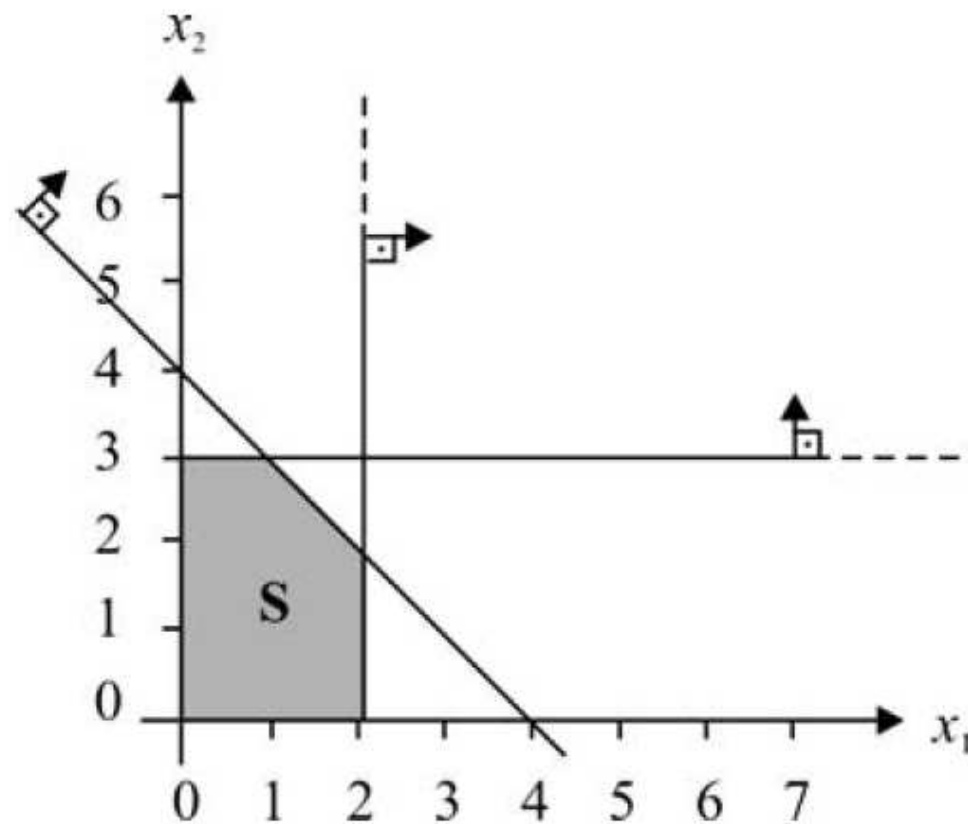
Região factível

$$S = \{(x_1, x_2) \text{ tal que } x_1 + x_2 \leq 4, x_1 \leq 2, x_2 \leq 3, x_1 \geq 0, x_2 \geq 0\}$$

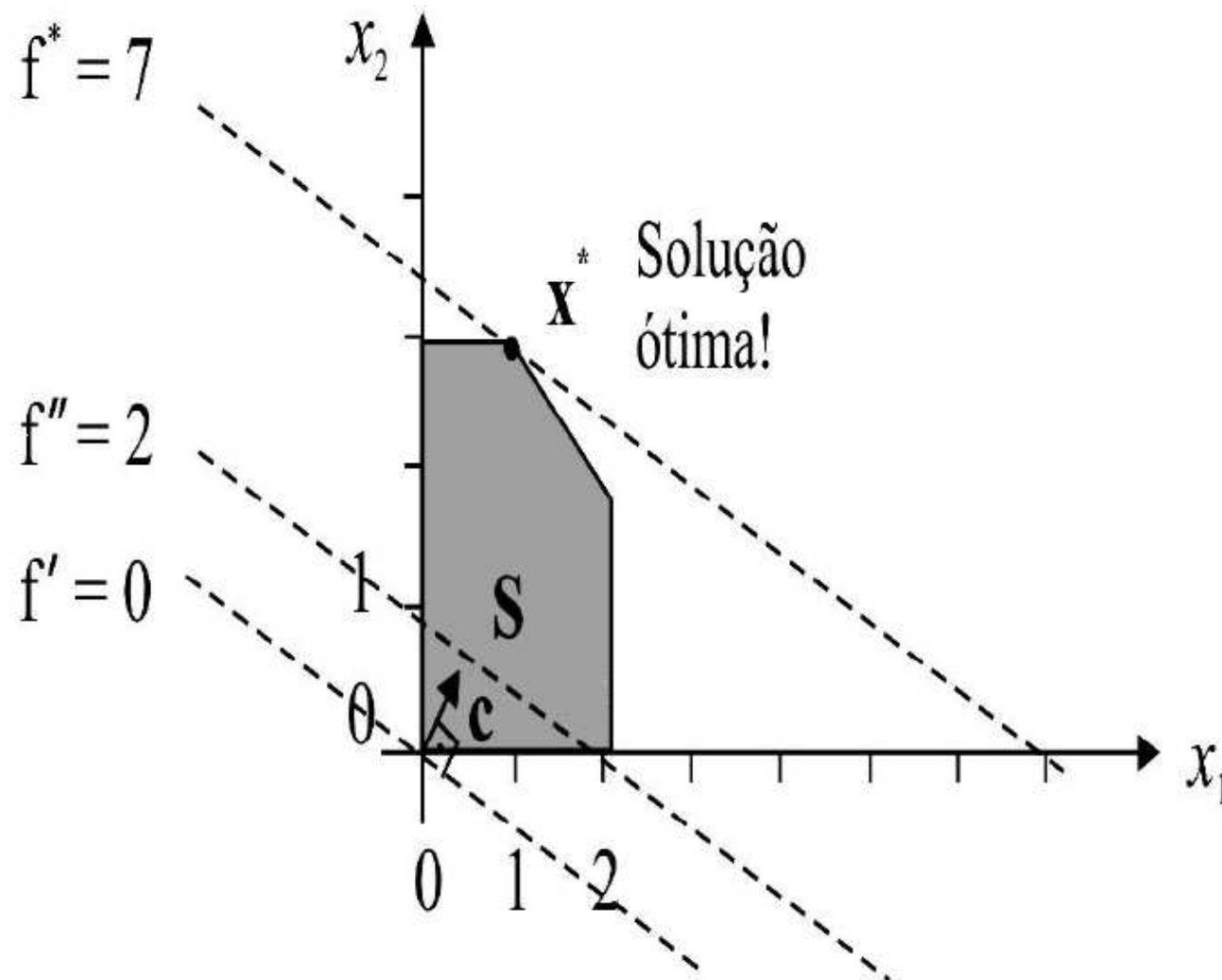


Região factível

$$\mathbf{S} = \{(x_1, x_2) \text{ tal que } x_1 + x_2 \leq 4, x_1 \leq 2, x_2 \leq 3, x_1 \geq 0, x_2 \geq 0\}$$

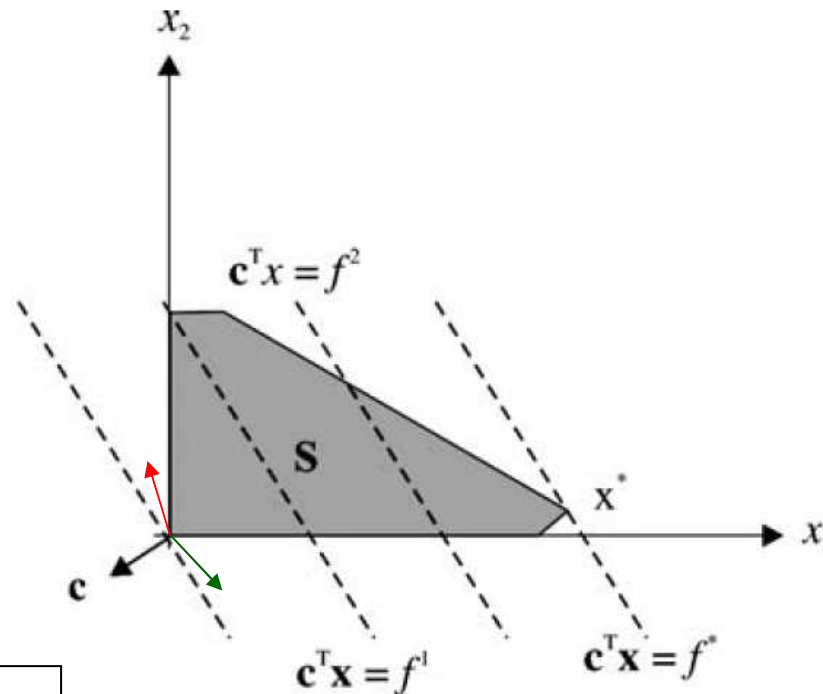


Curvas de nível



Pontos extremos

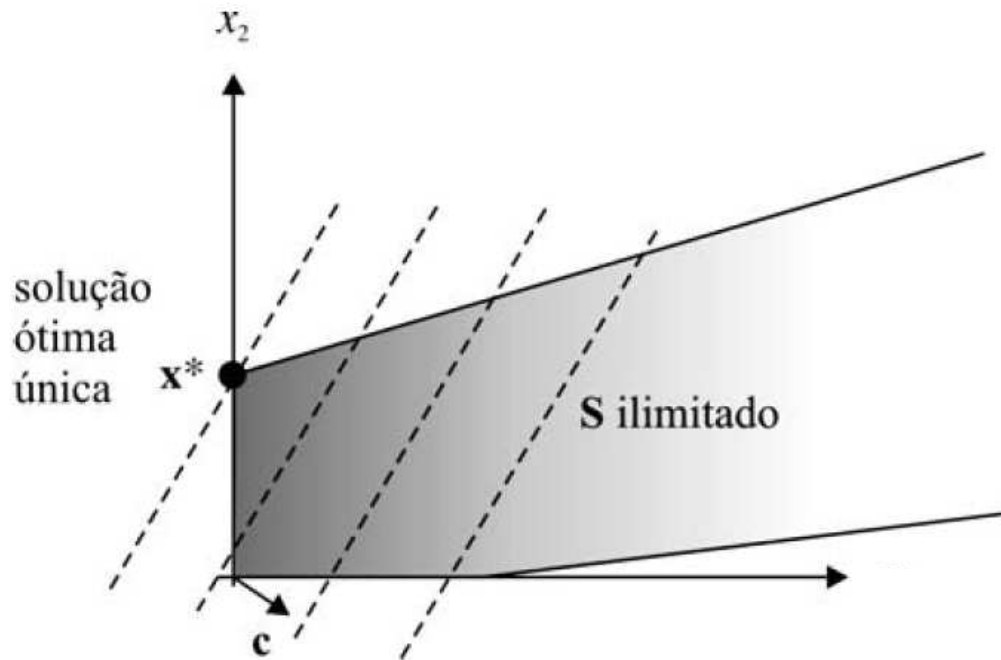
- Se um problema de otimização linear tem uma solução ótima, então existe um *vértice ótimo*.



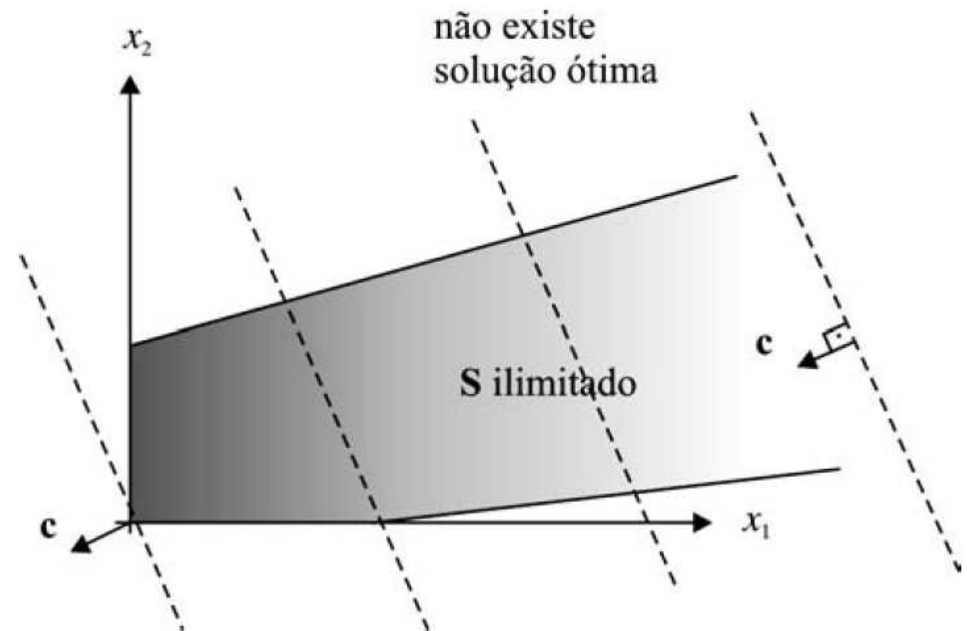
e para outras
funções objetivo ?

minimização

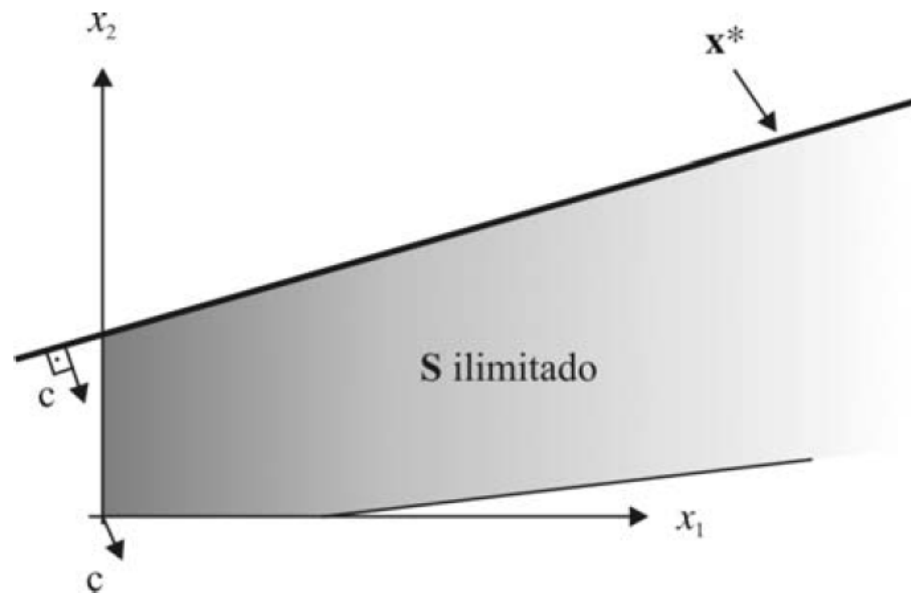
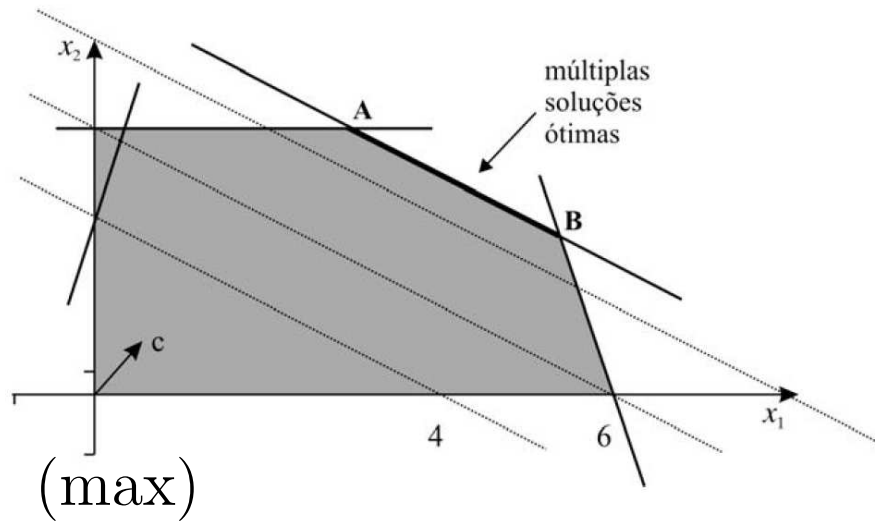
Região factível ilimitada



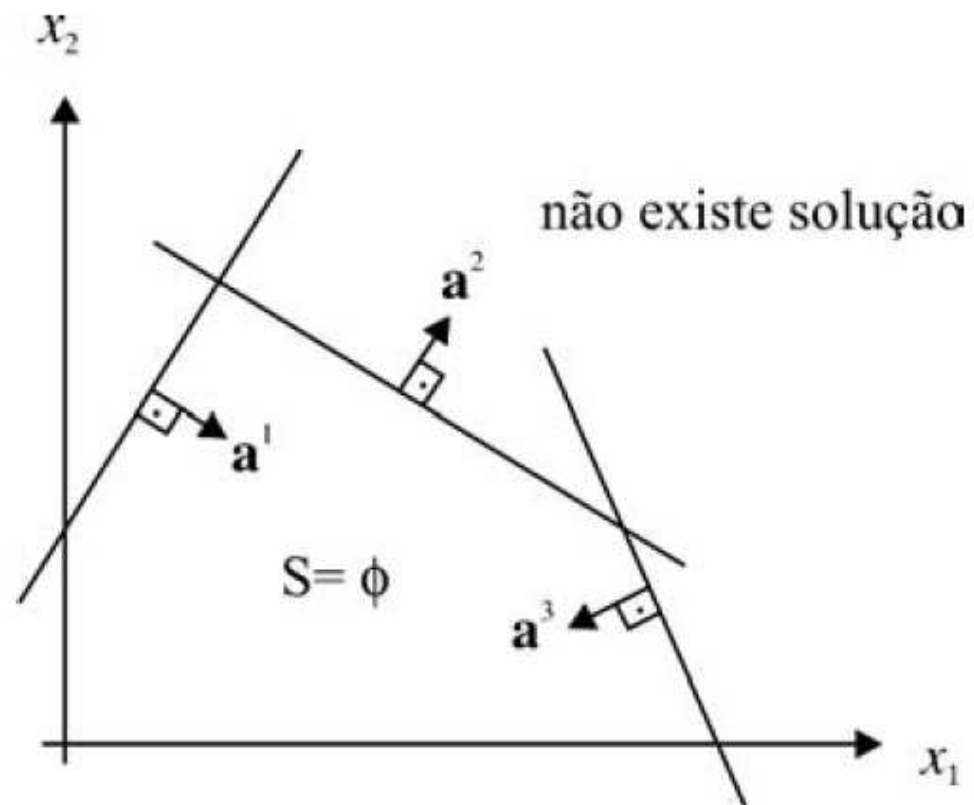
minimização



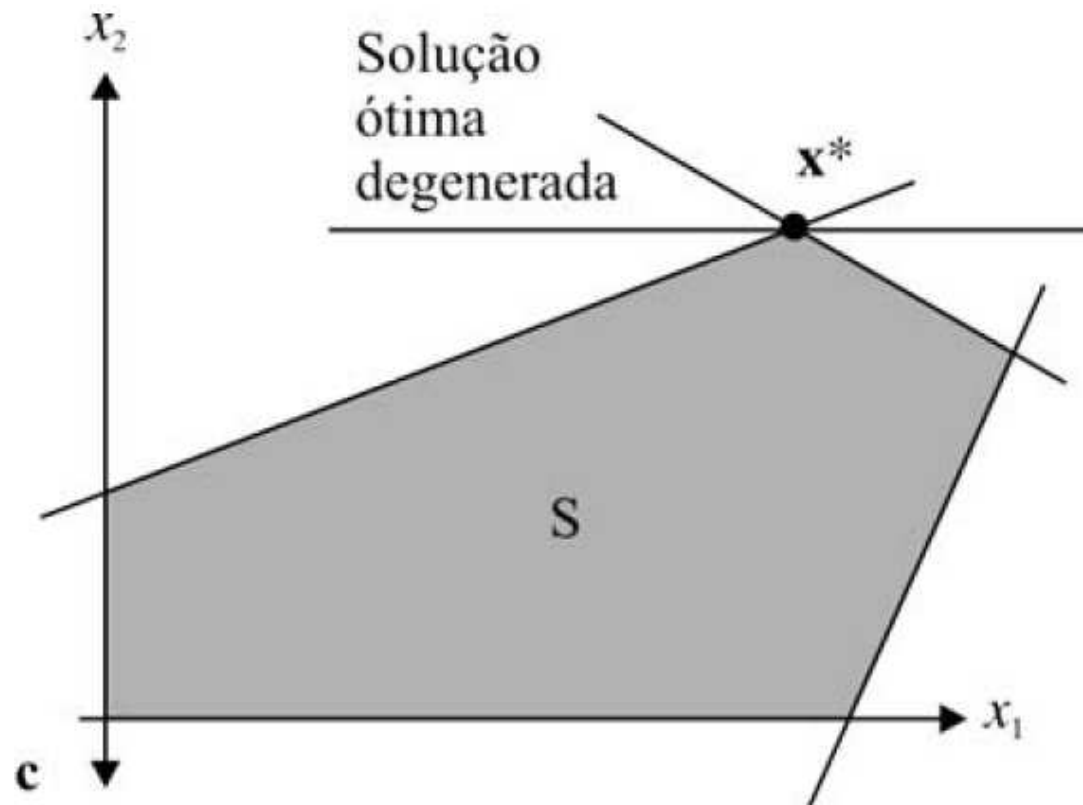
Múltiplos ótimos



Região infactível



Solução degenerada



Exemplo: sol. degenerada

Maximizar $f(x_1, x_2) = x_1 + 3x_2$

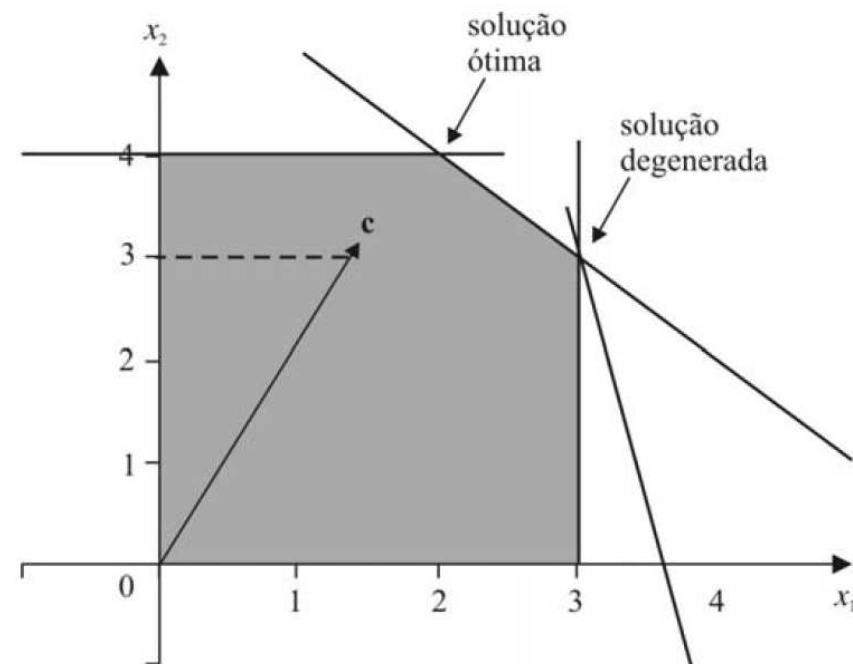
$$x_2 \leq 4$$

$$x_1 + x_2 \leq 6$$

$$x_1 \leq 3$$

$$5x_1 + x_2 \leq 18$$

$$x_1 \geq 0, x_2 \geq 0.$$



Método simplex (e met. de pontos int)

