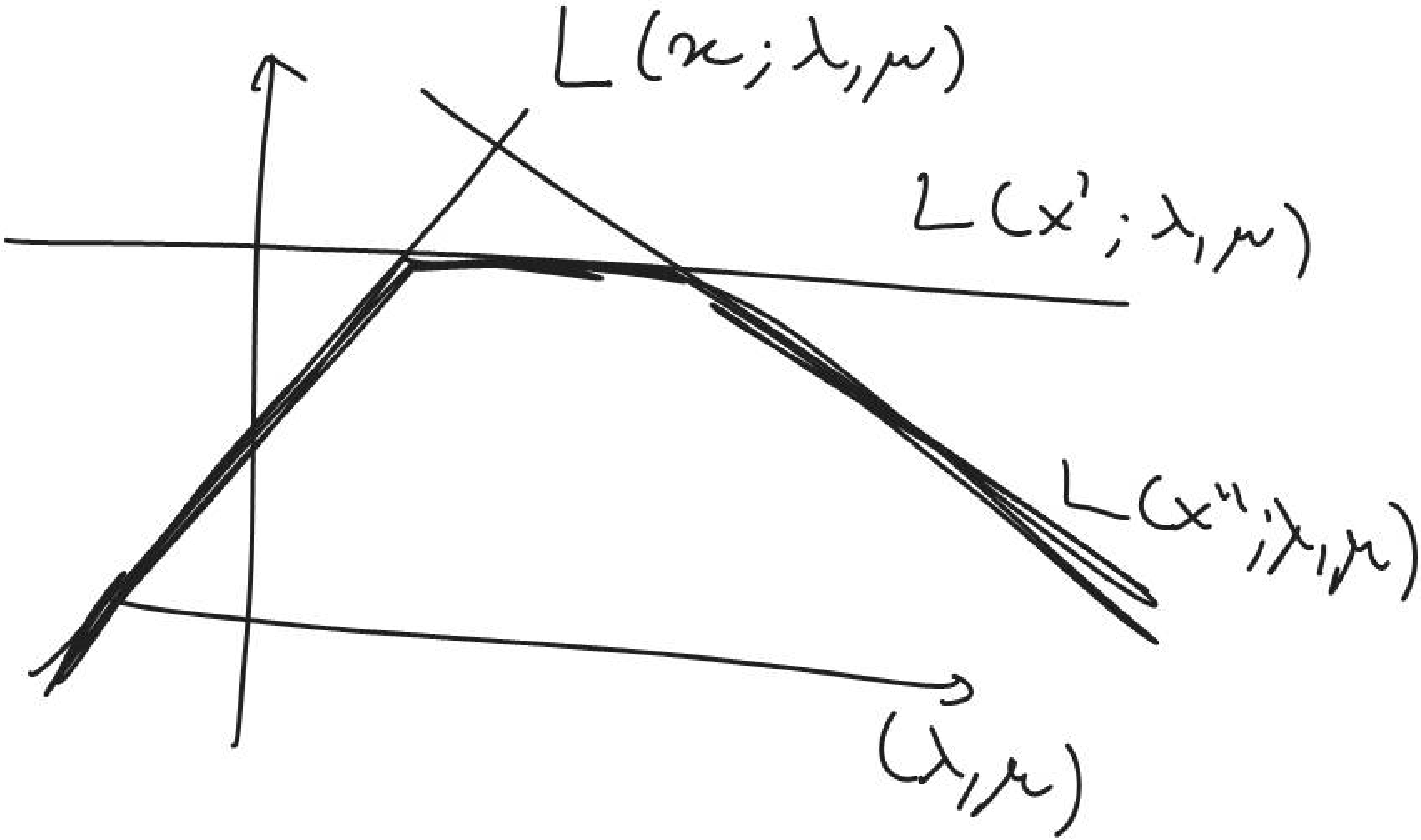
Exam

Thursday, May, 9

9:Hs 9 am

Lisbon 2pm



$L(x;\lambda,\mu)$
$L(x';\lambda,\mu)$
$L(x'';\lambda,\mu)$
(λ,μ)

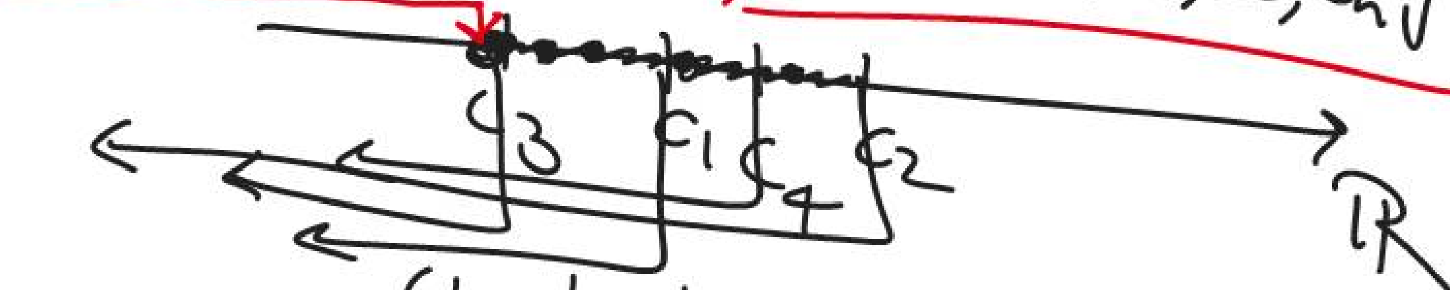
$\underline{P}$

$$\left[\begin{array}{ll} \min. & (c_1 x_1 + \cdots + c_n x_n) \\ \text{s.t.} & x_i \geq 0, \ \sum_i x_i = 1 \end{array}\right]$$

$n=4$

$$\| $$

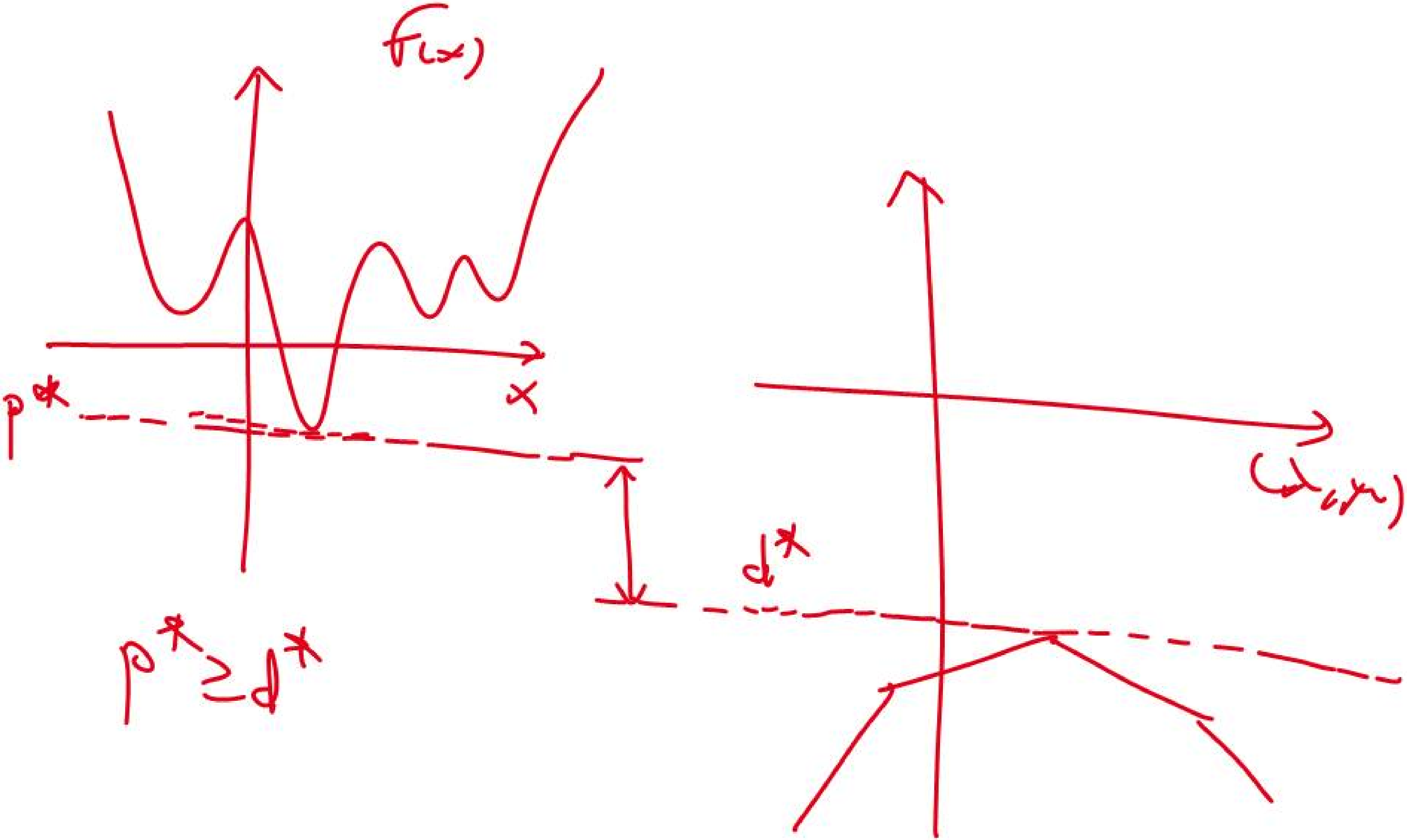
$$\min\{c_1, c_2, \ldots, c_n\}$$



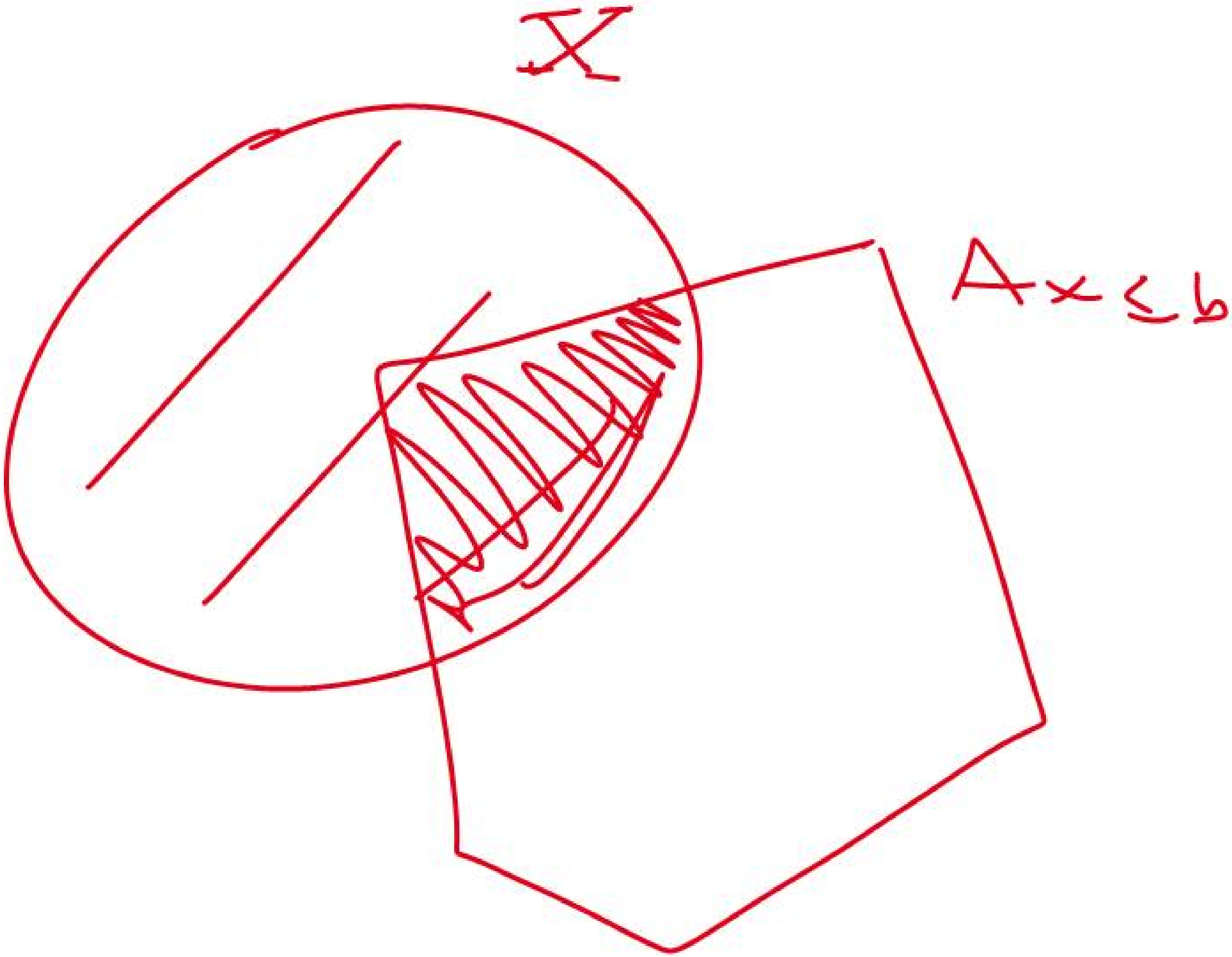
$x = (1/4, 1/4, 1/4, 1/4)$

$x = (0, 0, 1, 0)$

//



$p^* \geq d^*$

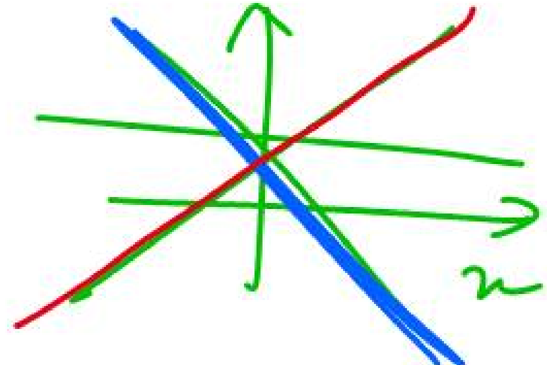


X
Ax ≤ b

$\underline{P}$: $\min \quad c^T x$

s.t. $\quad 1 - 1^T x = 0 \qquad \lambda \in \mathbb{R}$

$\qquad -x \le 0 \qquad \mu \in \mathbb{R}^n$



1) $L(x;\lambda,\mu) = \boxed{c^T x} + \lambda \boxed{(1 - 1^T x)} - \mu^T \boxed{x}$

$\qquad = x^T (c - \lambda 1 - \mu) + \lambda$

2) $L(\lambda,\mu) = \inf_x L(x;\lambda,\mu)$

$$= \begin{cases} \lambda & \text{if } c - \lambda 1 - \mu = 0 \\ -\infty & \text{oth.} \end{cases}$$

3) $\max.\ L(x, \mu)$

s.t. $\mu \geq 0$

$=$

$\max.\ \lambda$

s.t. $\mu \geq 0$

$c = \lambda \mathbb{1} + \mu$ $\quad (c - \lambda \mathbb{1} - \mu = 0)$

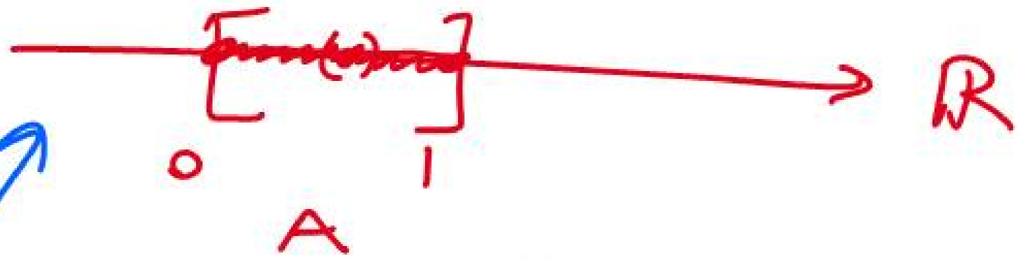
$\lambda \mathbb{1} = c - \cancel{\mu}$

$=$

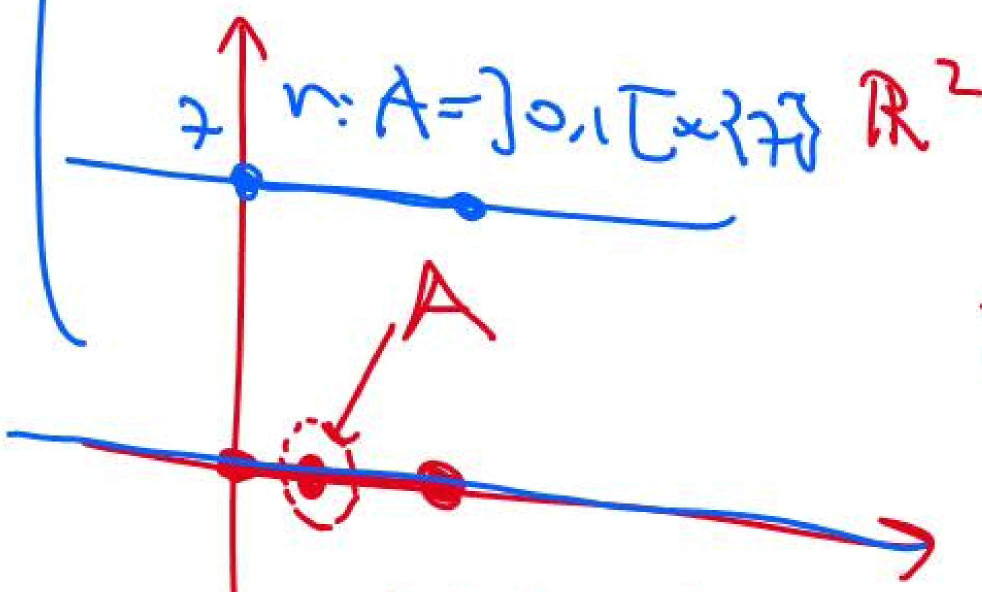
$\max\ \lambda$

s.t. $\lambda \mathbb{1} \leq c$

$\lambda \leq c_1$
$\lambda \leq c_2$
$\vdots$
$\lambda \leq c_n$



$\mathrm{int}(A) = \,]0,1[$



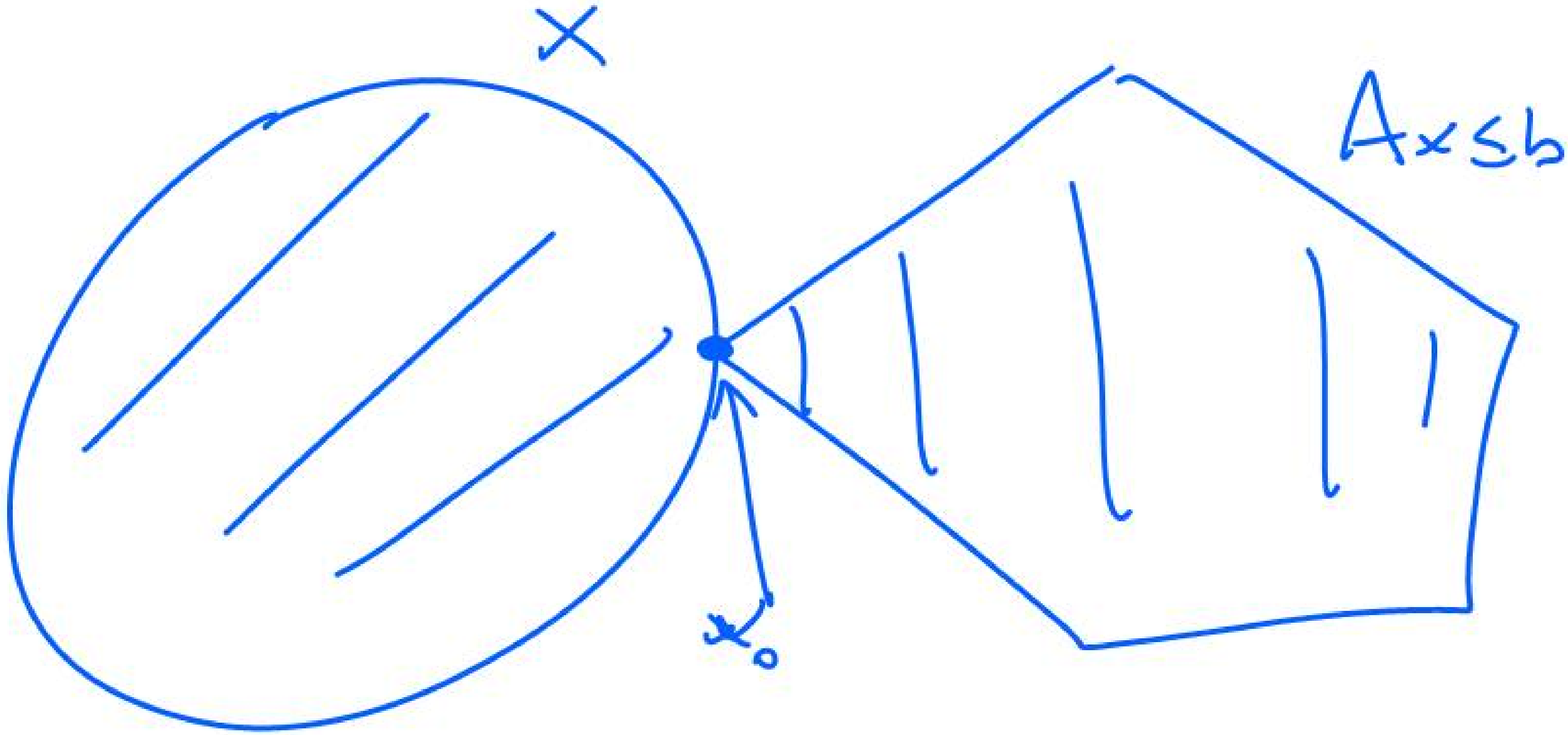
$\mathrm{int}(A) = \emptyset$

$r: A = \,]0,1[\, \times \{0\}$

$\mathrm{int}\, A \neq \emptyset$

$\Downarrow$

$r: A = \mathrm{int}\, A$


X
Ax≤b
x₀