Test

$$\underbrace{x_{[1]} + \cdots + x_{[k]}}\leq 0.8\,T$$

$$\left[\begin{array}{ll} \max. & x_1 y_1 + \cdots + x_n y_n \\ \text{s.t.} & \\ & 0 \leq y_i \leq 1 \\ & y_1 + \cdots + y_n = k \end{array}\right]$$

$\max \; x^T y$

s.t. $\underset{\mu}{0 \leq} \, y \, \underset{\nu}{\leq 1}, \quad 1^T y \underset{\lambda}{=} k$

1) $L(y;\mu,\nu,\lambda) = x^T y + \mu^T y + \nu^T(1-y) - \lambda(k - 1^T y)$

$= y^T\left(\boxed{x + \mu - \nu + \lambda 1}\right) + \underbrace{1^T \nu - \lambda k}$

2) $L(\mu,\nu,\lambda) = \sup\limits_{y} L(y;\mu,\nu,\lambda) = \begin{cases} 1^T\nu - \lambda k \; ; & x + \mu - \nu + \lambda 1 = 0 \\ +\infty \; ; & \text{oth.} \end{cases}$

3) $\min \; 1^T \nu - k\lambda$

s.t. $\boxed{x + \mu = \nu - \lambda 1}, \; \boxed{\mu \geq 0}, \nu \geq 0$

$\boxed{x \leq \nu - \lambda 1}$

$x_{[1]} + \dots + x_{[k]} \leq 0.8T$

$$\left[\begin{array}{ll} \max. & x^T y \\ \text{s.t.} & 0 \leq y \leq 1 \\ & 1^T y = k \end{array}\right] \leq 0.8T$$

$$\parallel$$

$$\left[\begin{array}{ll} \min. & 1^T u - k\lambda \\ \text{s.t.} & x \leq u - \lambda 1 \\ & u \geq 0 \end{array}\right] \leq 0.8T \iff \begin{cases} 1^T u - k\lambda \leq 0.8T \\ x \leq u - \lambda 1 \\ u \geq 0 \end{cases}$$

solvable

$$\min \; \|x - q\|^2$$
$$\text{s.t.} \; \boxed{x^T A x \leq 1} \leftarrow \mu$$

$\underline{c = 0}$

1) $L(x, \mu) = \|x - q\|^2 + \mu(x^T A x - 1)$

$$= x^T \underbrace{(\overset{>0}{I} + \overset{\geq 0}{\mu} \overset{>0}{A})}\, x - 2q^T x - \mu + \|q\|^2$$

$$\nabla(\cdot)(x^*) = 0$$

$$x^* = (I + \mu A)^{-1} q$$

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

$$= -q^T (I + \mu A)^{-1} q - \mu + \|q\|^2$$

3) $\max.\ -a^T(I+\mu A)^{-1}a - \mu + \|a\|^2$

s.t. $\mu \geq 0$

EVD

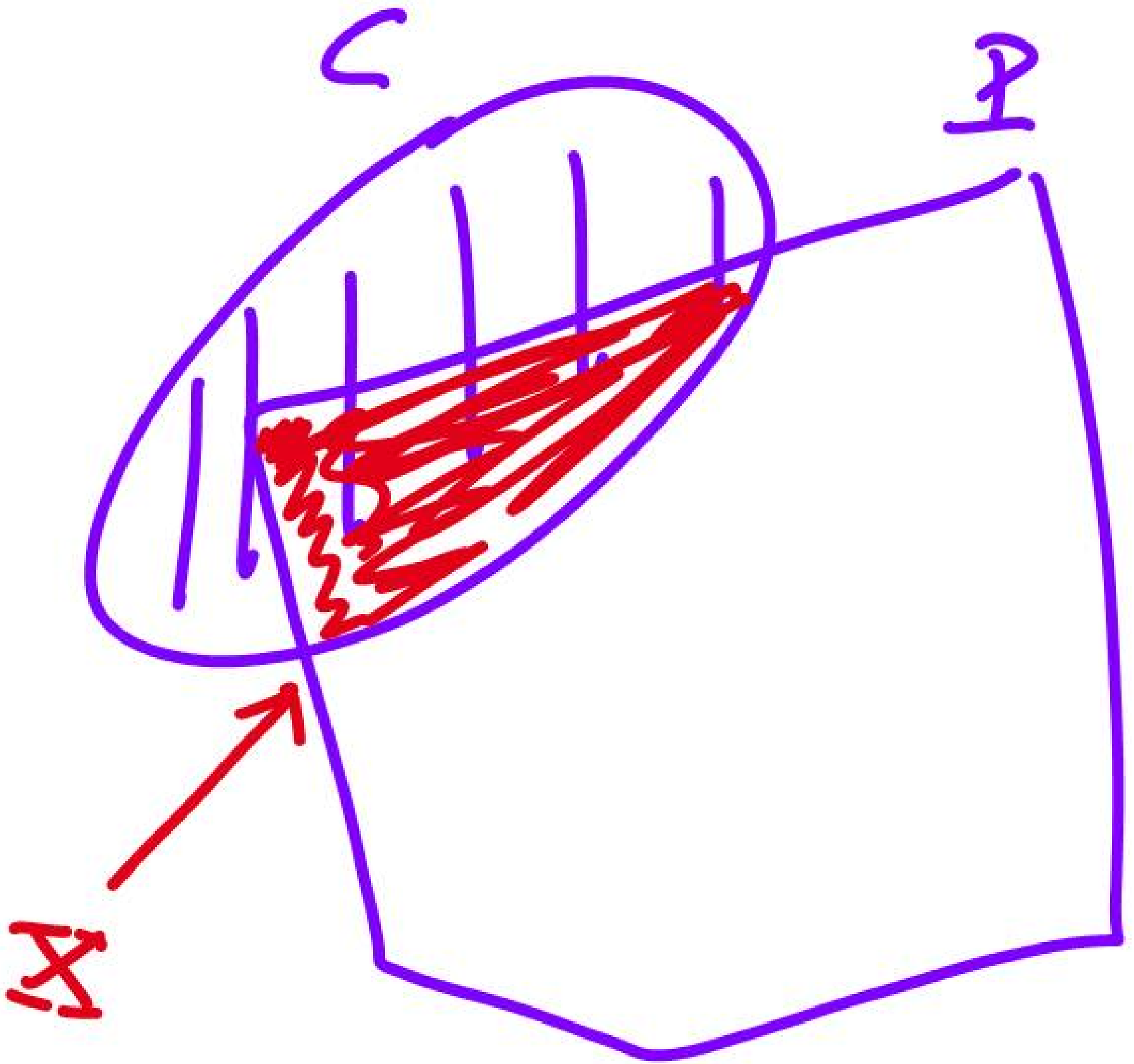
$$A = \begin{bmatrix} A_{11} & & 0 \\ & \ddots & \\ 0 & & A_{nn} \end{bmatrix}$$

$$A = Q \Lambda Q^T$$

$$a^T Q (I+\mu\Lambda)^{-1} Q^T a$$

α^T α

$$-\sum_i \frac{a_i^2}{1+\mu A_{nn}} - \mu + \|a\|^2$$

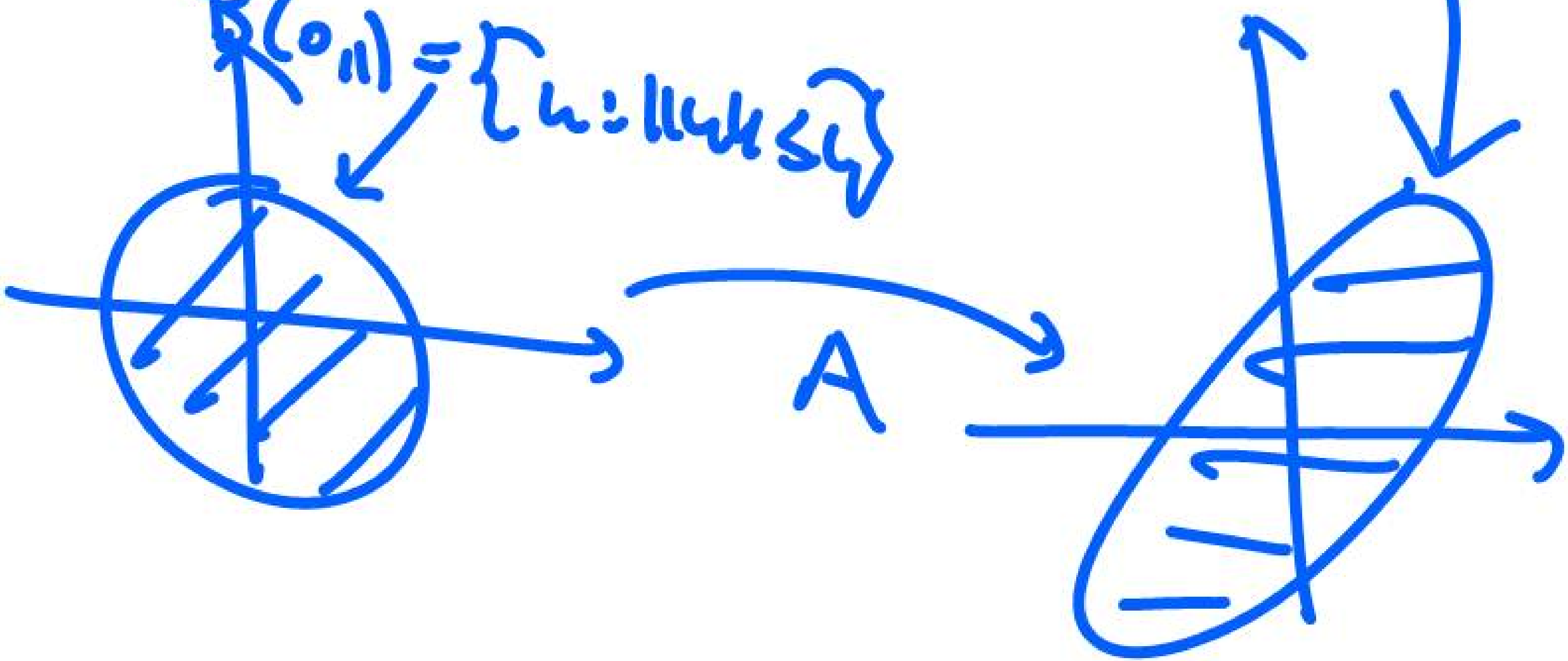


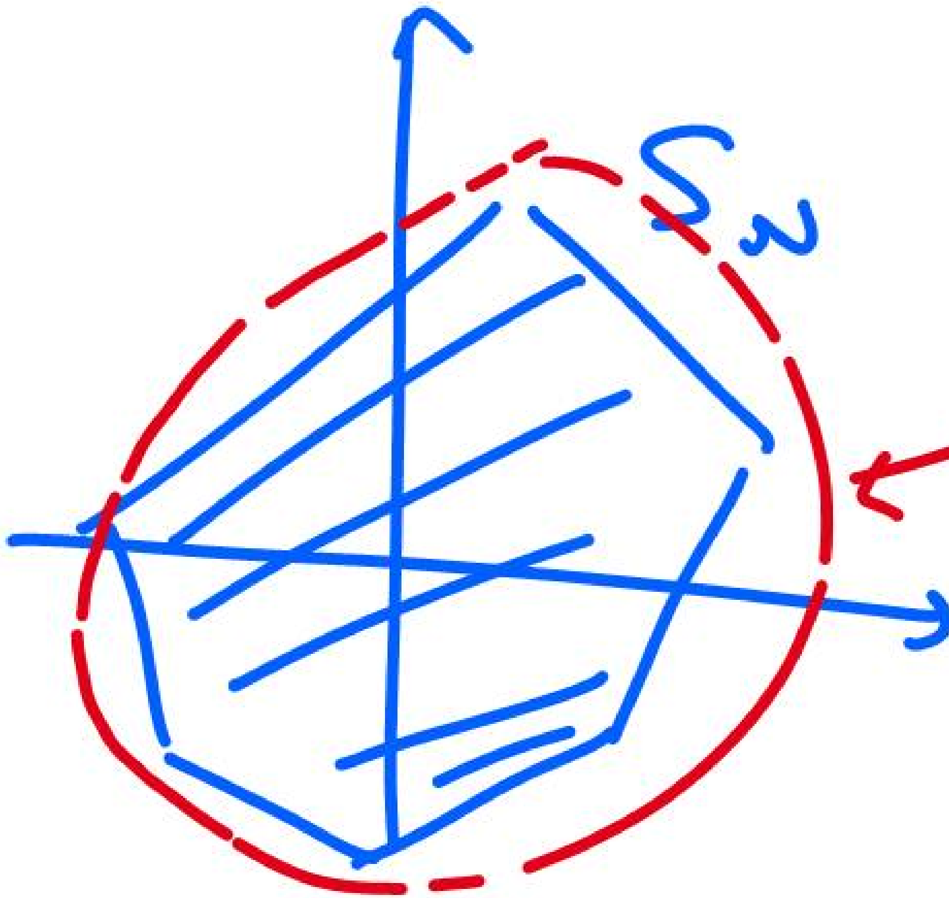
C
P
X

$A \in \mathbb{R}^{n \times n}$

$\{ Au : \|u\| \leq 1 \}$

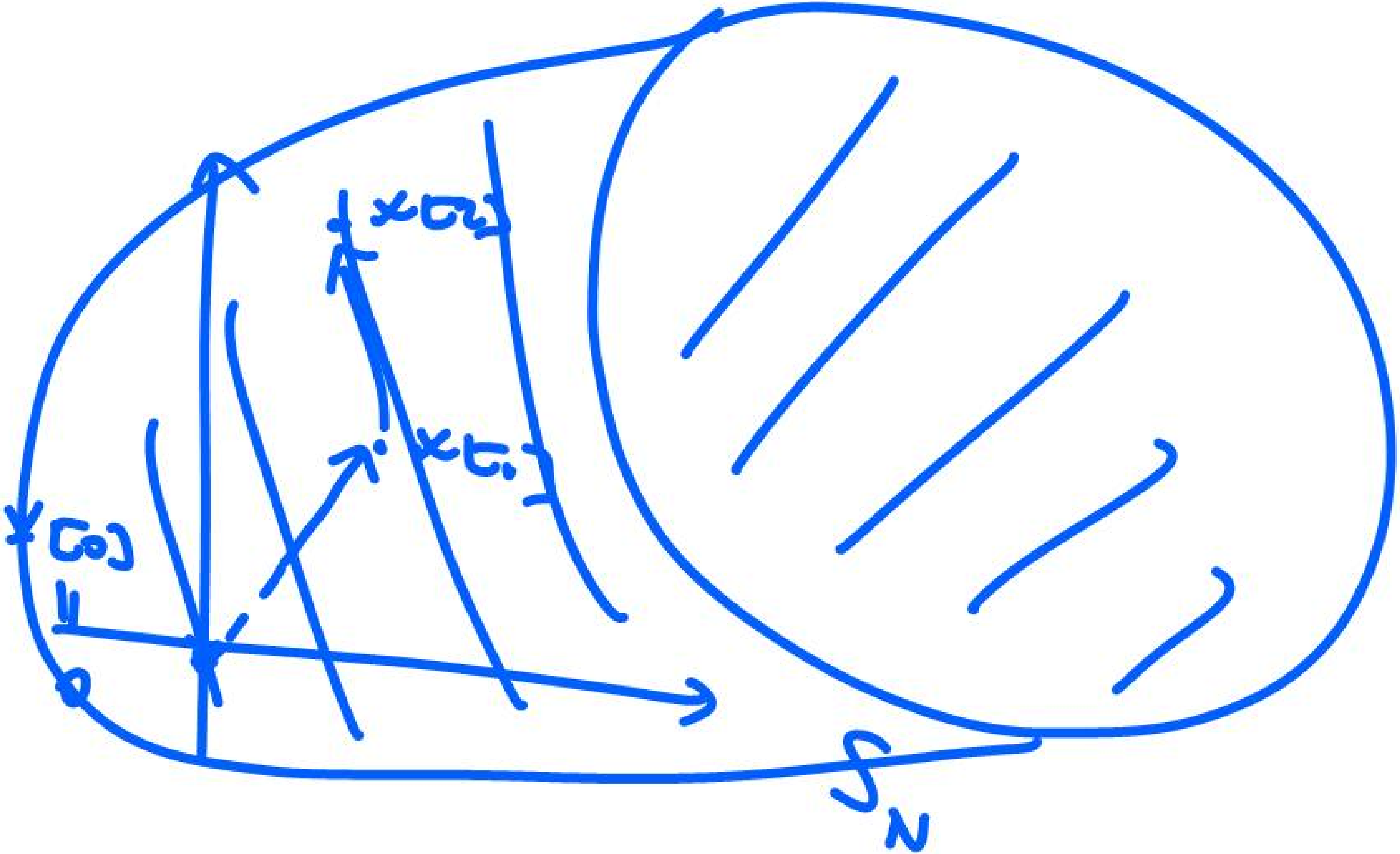
$B(0,1) = \{ u : \|u\| \leq 1 \}$





$W \succ 0$

$\{x : x^T W x \leq 1\}$


x[n₂]
x[n₁]
x[0]
=
0
S_N

$$S + T = \{ s + t : s \in S, \ t \in T \}$$