2022-05-04

(1) MLD → LC

- $\delta_i(1-\delta_i)=0 \rightarrow \delta_i=0$ or $\delta_i=1$

- LC all variables ≥ 0

$z = z^+ - z^-$ $\quad z^+ \geq 0,\ z^- \geq 0$ $\quad z^+ \perp z^-$

$$z=\begin{bmatrix}5\\-2\\1\\3\\-4\\0\end{bmatrix} \quad z^+=\begin{bmatrix}5\\0\\1\\3\\0\\0\end{bmatrix} \geq 0 \quad z^-=\begin{bmatrix}0\\2\\0\\0\\4\\0\end{bmatrix} \geq 0 \qquad z^+ \perp z^-$$

LC → MLD

22)

- $w \leq M_w \delta$
  $v \leq M_v (1-\delta)$
  $w, v \geq 0$

M_w is upper bound for w
" v
M_v "

$\delta = 1$

$w \leq M_w$ ✓
$v \leq 0$) $v=0$
$w, v \geq 0$

$\delta = 0$

$w \leq 0$
$v \leq M_v$ ✓
$w, v \geq 0$) $w=0$

(2) MLD → PWA

$z(t) = P_i\, x(t) + Q_i\, u(t)$ for region i ($i \to 1 \to 2$)

MMPS → ELC

$f \geq f_k$ & $f = f_k$ or $f = f_l$

$f \geq f_l$

$\downarrow$

$f \geq \max(f_k, f_l)$ $\quad\not\rightarrow\quad$ $f = \max(f_k, f_l)$

(3) ELC → MMPS

$$\sum_i \pi_{\underbrace{j \in \varphi_j}_{\geq 0}} \underbrace{\left(e_4 - \epsilon_1 x - \epsilon_2 u - \xi_3 \alpha \right)_j}_{\geq 0} = 0$$

for each i, $\exists j \in \varphi_j$ $\underbrace{\left(e_4 - \epsilon_1 x - \epsilon_2 u - \xi_3 \alpha \right)_j}_{\geq 0} = 0$

$$\min_{j \in \varphi_i} \left(e_4 - \epsilon_1 x - \epsilon_2 u - \xi_3 \alpha \right)_j = 0$$

↓

MMPS

(4) GLC → MLP

$$\begin{cases} x+y+2 \geq 0 & = 0 \quad \delta_1 \\ x+3 \geq 0 & = 0 \quad \delta_2 \\ y+2+7 \geq 0 & = 0 \quad \delta_3 \end{cases}$$

if δ is 0 the corresponding ineq. $= 0$

$\delta_1 + \delta_2 + \delta_3 = 2$ → at least 1 $\delta_i = 0$

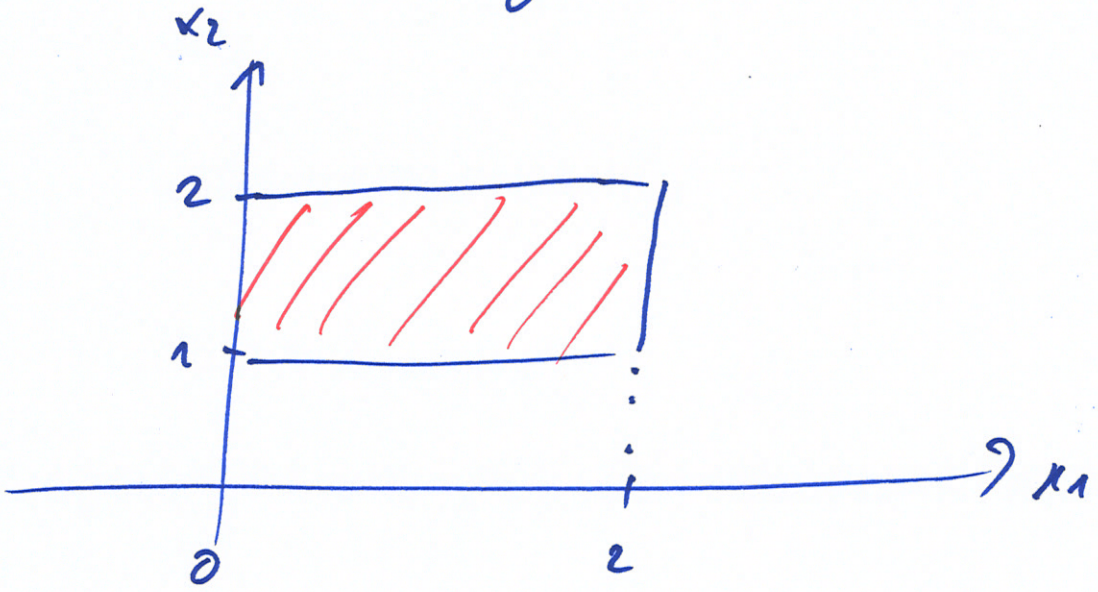
$\delta_1 = 0$ → $x+y+2=0$

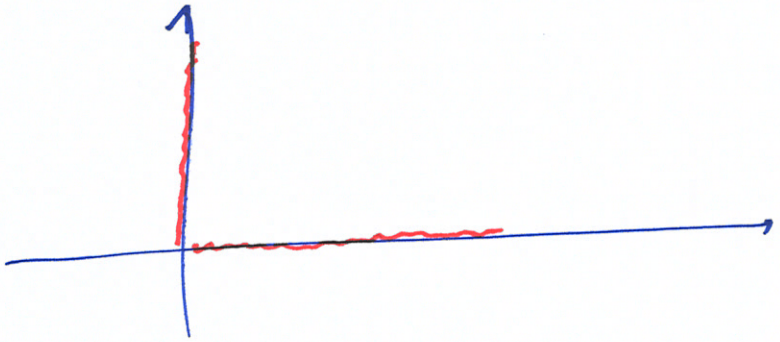
$M\delta_1 \geq x+y+2 \geq 0$

$M\delta_2 \geq x+3 \geq 0$

$M\delta_3 \geq y+2+7 \geq 0$

(5) rectangular sets





$x_1 = 0$ or $x_2 = 0$