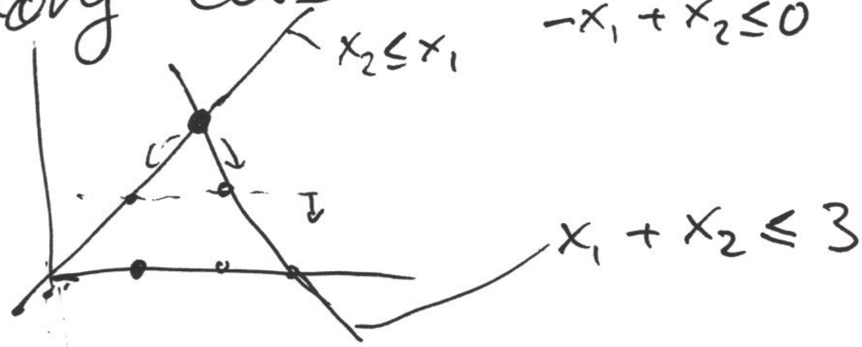
Gamory-Cuts



$$\max \quad x_2$$

$$\text{s.t.} \quad \begin{aligned} -x_1 + x_2 + x_3 &= 0 \\ x_1 + x_2 \quad\quad + x_4 &= 3 \end{aligned}$$

	0	1	0	0	0
(3)	-1	1	1	0	0
(4)	1	1	0	1	3

	1	0	-1	0	0
(2)	-1	1	1	0	0
(4)	2	0	-1	1	3

	0	0	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{3}{2}$
(2)	0	1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{2}$
(1)	1	0	$-\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{2}$

$$x_2 + \tfrac{1}{2}x_3 + \tfrac{1}{4}x_4 = \tfrac{3}{2}$$

$$x_1, x_2 \in \mathbb{Z} \Rightarrow x_3, x_4 \in \mathbb{Z}$$

$$x_2 - 1 = \underbrace{\tfrac{1}{2} - \tfrac{1}{2}x_3 - \tfrac{1}{2}x_4}_{\le 1/2}$$

$\Rightarrow \quad x_2 - 1 \le 0$ (aber x_2 in der basis)

$$\Rightarrow \quad \tfrac{1}{2} - \tfrac{1}{2}x_3 - \tfrac{1}{2}x_4 \le 0$$

$$+x_5 = 0$$

	0	0	$-1/2$	$-1/2$	0	$-3/2$
(2)	0	1	$1/2$	$1/2$	0	$3/2$
(1)	1	0	$-1/2$	$1/2$	0	$3/2$
(5)	0	0	$-1/2$	$-1/2$	1	$-1/2$

	0	0	0	0	-1	$\cancel{-1/2}\ -1$
(2)	0	1	0	0	1	1
(1)	1	0	0	1	-1	2
(3)	0	0	1	1	-2	1

$\Rightarrow \quad \cancel{x_3 \ge x_4 \ge}\ x_1 = 2,\ x_2 = 1$

Allg: Basis B, N in LP-Relax,

Tableauzeile $x_i + \bar{A}_{i\cdot} x_N = \bar{b}_i$

mit $\bar{b}_i > 0$, $\bar{b}_i \notin \mathbb{Z}$ (also in der BL $x_i \notin \mathbb{Z}$)

Gl lautet

$$x_i + \sum_{j \in N} \bar{a}_{ij} x_j = \bar{b}_i$$

GZZ Anteil nach links:

$$\underbrace{x_i + \sum \lfloor \bar{a}_{ij} \rfloor x_j - \lfloor b_i \rfloor}_{\text{für alle } x \in \mathbb{Z}^n \ \in \mathbb{Z}} = \underbrace{\underbrace{(b_i - \lfloor b_i \rfloor)}_{\in]0,1[} - \sum \underbrace{(a_{ij} - \lfloor a_{ij} \rfloor)}_{\geq 0} x_j}_{< 1}$$

$$\rightsquigarrow \quad (b_i - \lfloor b_i \rfloor) - \sum_j (a_{ij} - \lfloor a_{ij} \rfloor) x_j \leq 0$$

Verletzt von der akt. BL (weil $x_N = 0$, $b_i - \lfloor b_i \rfloor > 0$)

Verwendet keine Basisvar.