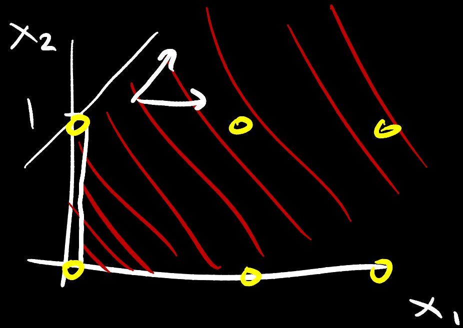
$$\{x \mid Ax \le b\} = \text{convex}(a_1, \dots, a_n) + \text{conic}(b_1, \dots, b_m)$$

$-x_1 \le 0$

$-x_2 \le 0$

$x_1 - x_2 \le -1$



$$\underset{\text{hull}}{\text{convex}}(S) = \left\{ \sum_i \lambda_i a_i \;\middle|\; \begin{array}{l} \lambda_i \ge 0 \\ \sum \lambda_i = 1 \end{array} \right\}$$

$$\underset{\text{cone}}{\text{conic}}(S) = \left\{ \sum_i \alpha_i b_i \;\middle|\; \lambda_i \ge 0 \right\}$$

$$\lambda_i, \alpha_i \in \cancel{\mathbb{R}} \; \mathbb{Q}$$

$$\{(x_1,x_2) \mid A(x_1,x_2) \le b\} = \text{convex}\left(\begin{pmatrix}0\\0\end{pmatrix}, \begin{pmatrix}0\\1\end{pmatrix}\right) + \text{conic}\left(\begin{pmatrix}1\\0\end{pmatrix}, \begin{pmatrix}1\\1\end{pmatrix}\right)$$

$$\{x \mid Ax \le b\} \cap \mathbb{Z}^d = ?$$

$\{x \mid Ax \le b\}$ $\quad b, A$ – rational, i.e. $\in \mathbb{Q}^d$, $\in \mathbb{Q}^{m,n}$

$$\| \quad \text{convex}\underbrace{(a_1, \dots, a_n)}_{\subset\, \mathbb{Q}^d} + \text{conic}\underbrace{(b_1, \dots, b_m)}_{\subset\, \mathbb{Q}^d} = \frac{1}{M}\,\text{convex}\overbrace{(a_1', \dots, a_n')}^{\in\, \mathbb{Z}^d} + \text{conic}\underbrace{(b_1', \dots, b_m')}_{\subset\, \mathbb{Z}^d}$$

Let $\quad Ax \le b, \quad x \in \mathbb{Z}^d$

$$k_i \in \{0,1,2,\dots\}$$

$$x = \frac{1}{M} \sum \lambda_i a_i' + \sum \alpha_i b_i' \qquad \alpha_i = k_i + z_i \qquad 0 \le z_i < 1$$

$$= \underbrace{\frac{1}{M} \sum \lambda_i a_i + \sum z_i b_i'}_{c_1, \dots, c_N} + \sum k_i b_i' = \bigcup_{j=1}^{N} \left\{ c_j + \sum k_i b_i' \right\}$$

semilinear