Polytopes

$$P = \left\{ \sum_{i=1}^{K} \lambda_i v_i \in \mathbb{R}^K \;\middle|\; \begin{array}{l} \sum_{i=1}^{K} \lambda_i = 1 \\ \lambda_i \geq 0 \\ v_i \in V \end{array} \right\}$$

$$V = \{(0,0), (\tfrac{1}{2},0), (\tfrac{1}{2},\tfrac{1}{4}), (0,\tfrac{1}{4})\}$$

$\lambda = (\frac{1}{4}, 0, \frac{1}{2}, 0)$

$V = \frac{1}{4}(0,0) + 0(\frac{1}{2},0) + \frac{1}{2}(\frac{1}{2},\frac{1}{4}) + \frac{1}{4}(0,\frac{1}{4})$

$= (\frac{1}{4}, \frac{1}{8} + \frac{1}{12}) \in P$