



## Definition

The *convex hull* (or *real convex hull*) of a set  $A \subset \mathbf{R}^n$  is the intersection of all convex sets containing the set. In other words, it is the smallest convex set containing  $A$ .

## Notation

We denote the convex hull of  $S \subset \mathbf{R}^n$  by  $\text{conv } S$ .

## Characterization

**Proposition 1.** *Let  $S \subset \mathbf{R}^n$ .  $\text{conv } S$  is the set of all convex combinations of elements of  $S$ .*

**Proposition 2.** *The convex hull of  $\{b_1, \dots, b_m\} \subset \mathbf{R}^n$  consists of all vectors*

$$\lambda_1 b_1 + \lambda_2 b_2 + \dots + \lambda_m b_m.$$

*where  $\lambda_i \geq 0$  and  $\sum_i \lambda_i = 1$ .*



