



Definition

A *convex set* contains every closed line segment between any two points. Every affine set is convex.

Notation

Let x and y in \mathbf{R}^n . We can express the closed line segment between x and y as

$$\{x + a(y - x) \mid 0 \leq a \leq 1, x, y \in \mathbf{R}^n\}.$$

Notice that $x + a(y - x) = (1 - a)x + ay$.

Proposition 1. *Every affine set is convex.*

Proposition 2. *The intersection of a family of convex sets is convex.*

Proposition 3. *The translate of a convex set is convex. The scalar multiple of a convex set is convex.*

