Convex Sets

1 Why

2 Definition

The *closed line segment* between x and y in $\mathbf{R}^n$ is the set

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

the *open line segment* between x and y is the closed line segment with the points x and y.

A *convex set* contains every closed line segement between any two points. Convex sets are more general than affine sets since need only contain a portion of the line through any two points.

Proposition 1. *Every affine set is convex.*