



Why

Since every affine set is a translate of some (unique) subspace, it is natural to define the dimension of an affine set as the dimension of this subspace.

Definition

The *dimension* of a nonempty affine set is the dimension of the subspace parallel to it. By convention, \emptyset has dimension -1 . Naturally, the *points*, *lines* and *planes* are affine sets of dimension 0, 1, and 2 respectively.

If an affine set has dimension r , then we often call it an *r-flat*.

For any $S \subset \mathbf{R}^n$, we define the dimension of A to be the dimension of the affine hull of A .

Notation

We denote the dimension of the set $S \subset \mathbf{R}^n$ by $\dim S$. We have defined it so that

$$\dim S = \dim \operatorname{aff} S$$

This makes sense if S is affine, since in this case $\operatorname{aff} S = S$.

Result

Proposition 1. *Any r -flat has $r + 1$ affinely independent points. Each of its sets of size $r + 2$ are affinely dependent.*

