Affine Sets

1 Why

2 Definition

The *line through* two points in n-dimensional space is the set of points which can be expressed as the sum of the first point and a scaled multiple of the difference between the second point and the first. An *affine set* is a subset of n-dimensional space which contains the lines through each of its points.

2.1 Examples

The empty set is trivially an affine set. The entire set of points in n-dimensional space is an affine set. Any singleton is an affine set.

2.2 Notation

The *line through* two points x and y in R^n is the set

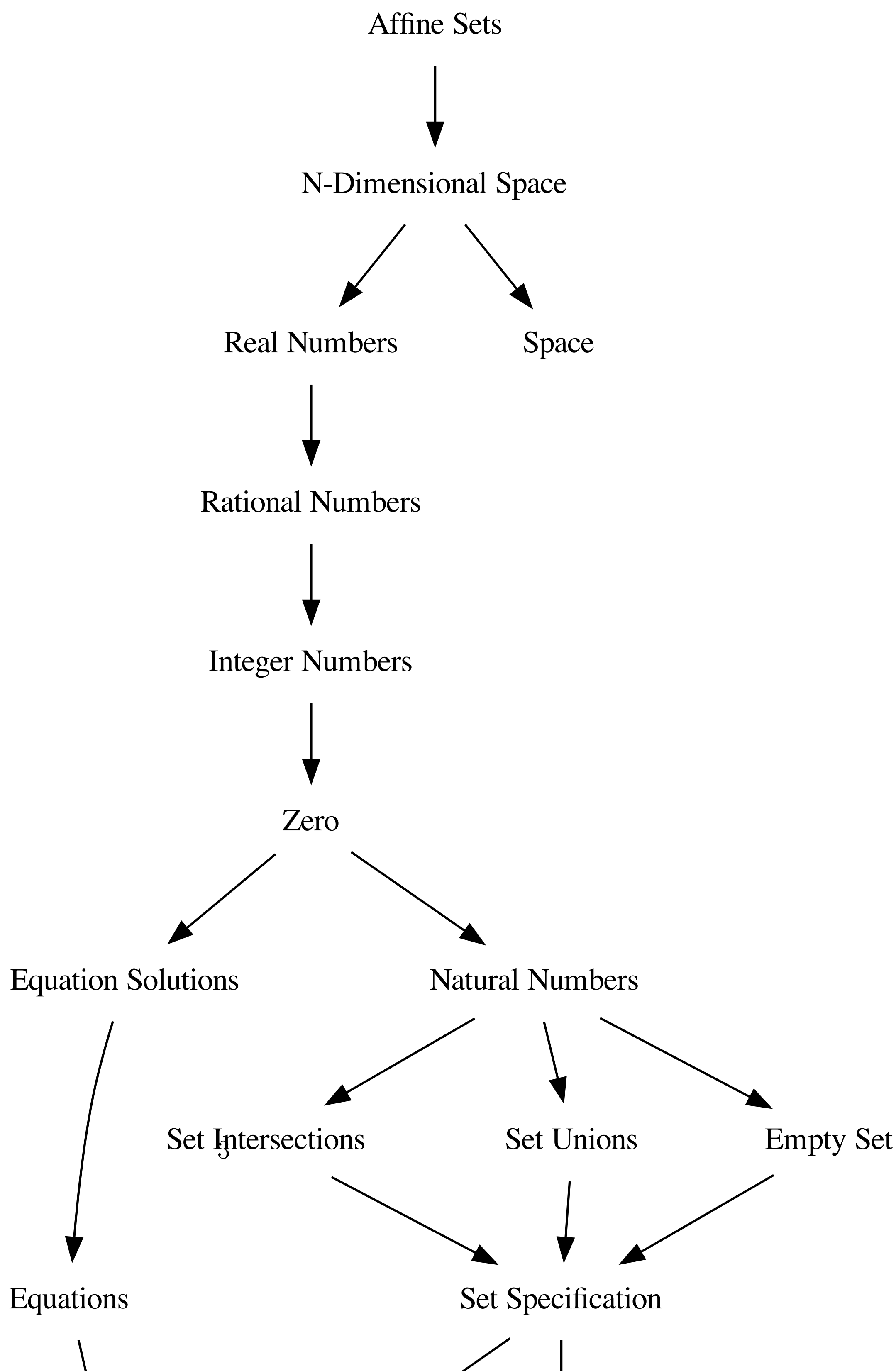
$$\{x + a(y - x) \mid a \in \mathsf{R} \text{ and } x, y \in \mathsf{R}^n\}.$$

Notice that the expression $x + a(y - x)$ is equivalent to $(1 - a)x + ay$.

2.3 Other Terminology

Some authors call affine sets *affine varieties*, *linear varieties* or *flat*.

Proposition 1. *The intersection of a family of affine sets is affine.*


Affine Sets
N-Dimensional Space
Real Numbers
Space
Rational Numbers
Integer Numbers
Zero
Equation Solutions
Natural Numbers
Set Intersections
Set Unions
Empty Set
Equations
Set Specification