Linear Algebra

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Contents

1 Brief Review

Commonly Used Sets

- $\mathbb{N}$: set of **natural numbers**
  could be *positive* integers
  could be *nonnegative* integers
- $\mathbb{Z}$: set of **integers**
- $\mathbb{Q}$: set of **rational numbers**
- $\mathbb{R}$: set of **real numbers**

Set Building

To denote sets too large to just list, we use **set builder** notation:

$$\{\text{candidate} : \text{condition}\}$$

Examples:

$$\{x \text{ is a fruit} : x \text{ is of yellow color}\}$$
$$\{x \text{ is a human being} : x \text{ is a president of the U.S.}\}$$
$$\{x \text{ is a city} : x \text{ is a capitol of a country}\}$$

Other Notations

- $\forall$: for all
- $\exists$: there exists
- s.t.: such that
- $\rightarrow\leftarrow$: contradiction
- WTS: want to show

2 Real Vector Spaces

A **real vector space** is simply a *nonempty set* that satisfies 10 properties called 10 axioms of a real vector space.