

Linear Algebra

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Chapter 1

Vector space

1.1 \mathbb{R}^n and \mathbb{C}^n

We are already be familiar with basic properties of the set of real numbers(\mathbb{R}). Complex numbers comes when we can take square roots of negative numbers. The idea is to assume we have a square root of -1 , denoted by i that obeys the usual rules of arithmetic. Here are the formal definition.

Definition 1.1 (Complex Numbers).

- A complex number is an ordered pair (x, y) , where $x, y \in \mathbb{R}$, but we will write this as $x + yi$.
- The set of all complex numbers is denoted by \mathbb{C} :

$$\mathbb{C} = \{x + yi \mid x, y \in \mathbb{R}\}.$$

- Addition and multiplication on \mathbb{C} are defined by

$$(x + yi) + (u + vi) = (x + u) + (y + v)i,$$

$$(x + yi)(u + vi) = (xu - yv) + (xv + yu)i;$$

here $x, y, u, v \in \mathbb{R}$

Chapter 2

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