

01: Introduction to Module 2 - Vectors

Chapter Goal: To provide an overview of the key concepts that will be covered in this module, which focuses on the essential properties and operations of [Vectors](#).

Module Roadmap

This module will explore the fundamental things we can do with vectors beyond simple addition and scaling. After this, we will move on to matrices in subsequent modules.

The topics we will cover are:

1. **Modulus (or Magnitude):**

- How to define and calculate the **length** or size of a vector.

2. **Dot Product (Inner Product):**

- A way to "multiply" two vectors to produce a single **number (scalar)**.

3. **Projections:**

- Using the dot product to find the "shadow" of one vector onto another. We will look at both **scalar** (length of the shadow) and **vector** (the shadow as a new vector) projections.

4. **Basis Vectors & Linear Independence:**

- Revisiting the vectors that define a coordinate system (**basis vectors**).
 - Understanding the concepts of **linear independence** and **linear combinations** more formally.
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