Linear Algebra

AIMA 104

Department of Artificial Intelligence,
Kathmandu University, Panchkhal, Kavre

Lecture notes by
Sandesh Thakuri
Sandesh.775509@cdmath.tu.edu.np

Text Book:

1. David C. Lay, Linear Algebra and Its Applications (4th edition), Pearson.
2. Gilbart Strang, Introduction to Linear Algebra, Wellesley-Cambridge Press.

2025

Contents

1 Matrix and Vectors

1.1 Introduction

To give a clear introduction of the course linear algebra, we need to look at it aleast from three sides, and consequently we can say that we can approch it from the following three sides.

1. **Representation System**

   Linear Algebra is the algebra for Multivariable Calculus. The vectors and matrices are the building block of linear algebra. And linear algebra consists of the algebra of vectors and matrices, just like ordinary algebra is the algebra of numbers and their variables. Consider a multivariable function $f : \mathbb{R}^2 \mapsto \mathbb{R}^2$ defined by $f(x_1, x_2) = 3x_1 + 2x_2$. The consise representation of the multivariable functions give rise to vectors and matrices as follows:
   Let, $\vec{x} = (x_1, y_1)$ and $\vec{a} = (3, 2)$. Then the above function is f is represented as $f(\vec{x}) = \vec{a}'.\vec{x}$.