

Advanced Mathematical Typesetting in LaTeX

Your Name

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1 Introduction

Introduction to advanced mathematical typesetting.

2 Complex Algebraic Structures

Examples of complex algebraic structures:

2.1 Matrices and Vectors

$$\mathbf{A} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}, \quad \mathbf{v} = \begin{pmatrix} v_1 \\ v_2 \end{pmatrix} \quad (1)$$

2.2 Custom Operators

$$\text{Rank}(\mathbf{A}), \quad \text{Span}(\mathbf{v}) \quad (2)$$

3 Theorems and Definitions

Definition 3.1 (Euclidean Space). A Euclidean space is a finite-dimensional inner product space.

Theorem 3.1. *Every finite-dimensional inner product space is a Euclidean space.*

Proof. The proof is left as an exercise for the reader. □

Remark. This is an important theorem in linear algebra.

4 Algorithms

Algorithm 1 Example Algorithm

```
1: procedure EXAMPLE( $a, b$ )  
2:    $r \leftarrow a \bmod b$   
3:   while  $r \neq 0$  do  
4:      $a \leftarrow b$   
5:      $b \leftarrow r$   
6:      $r \leftarrow a \bmod b$   
7:   end while  
8:   return  $b$   
9: end procedure
```
