

Linear Algebra Notes

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Week 4

1 Determinant of Matrix

1.1 Features and uses

- It is unique number.
- It is used to find the area of a triangle.
- It is used to find the inverse of a matrix.
- It is used to solve the system of linear equations.

1.2 Orders

1. Order 1

$$A = [a_{11}]$$

$$|A| = a_{11}$$

2. Order 2

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$$

$$|A| = a_{11}a_{22} - a_{21}a_{12}$$

3. Order 3

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

$$|A| = a_{11} \begin{vmatrix} a_{22} & a_{23} \\ a_{32} & a_{33} \end{vmatrix} - a_{12} \begin{vmatrix} a_{21} & a_{23} \\ a_{31} & a_{33} \end{vmatrix} + a_{13} \begin{vmatrix} a_{21} & a_{22} \\ a_{31} & a_{32} \end{vmatrix}$$