Bachelor of Science (BSc) in Physical Sciences

Matrix Algebra

Definition of Matrix Algebra

Matrix algebra is a branch of linear algebra that deals with matrices, which are rectangular arrays of numbers or symbols. Matrices are fundamental in various mathematical and scientific applications.

Matrix Representation

Matrices are represented by rows and columns, and each entry in the matrix is called an element. For example, a 2x3 matrix has two rows and three columns

Basic Operations

Matrix addition and subtraction involve adding or subtracting corresponding elements. Scalar multiplication multiplies each element of a matrix by a scalar (a single number)

Matrix Multiplication

Matrix multiplication is a key operation in matrix algebra. The product of matrices A and B is obtained by taking the dot product of each row of A with each column of B.

Identity Matrix

The identity matrix, denoted as I, is a special square matrix with ones on the main diagonal and zeros elsewhere. Multiplying any matrix by the identity matrix leaves the matrix unchanged.
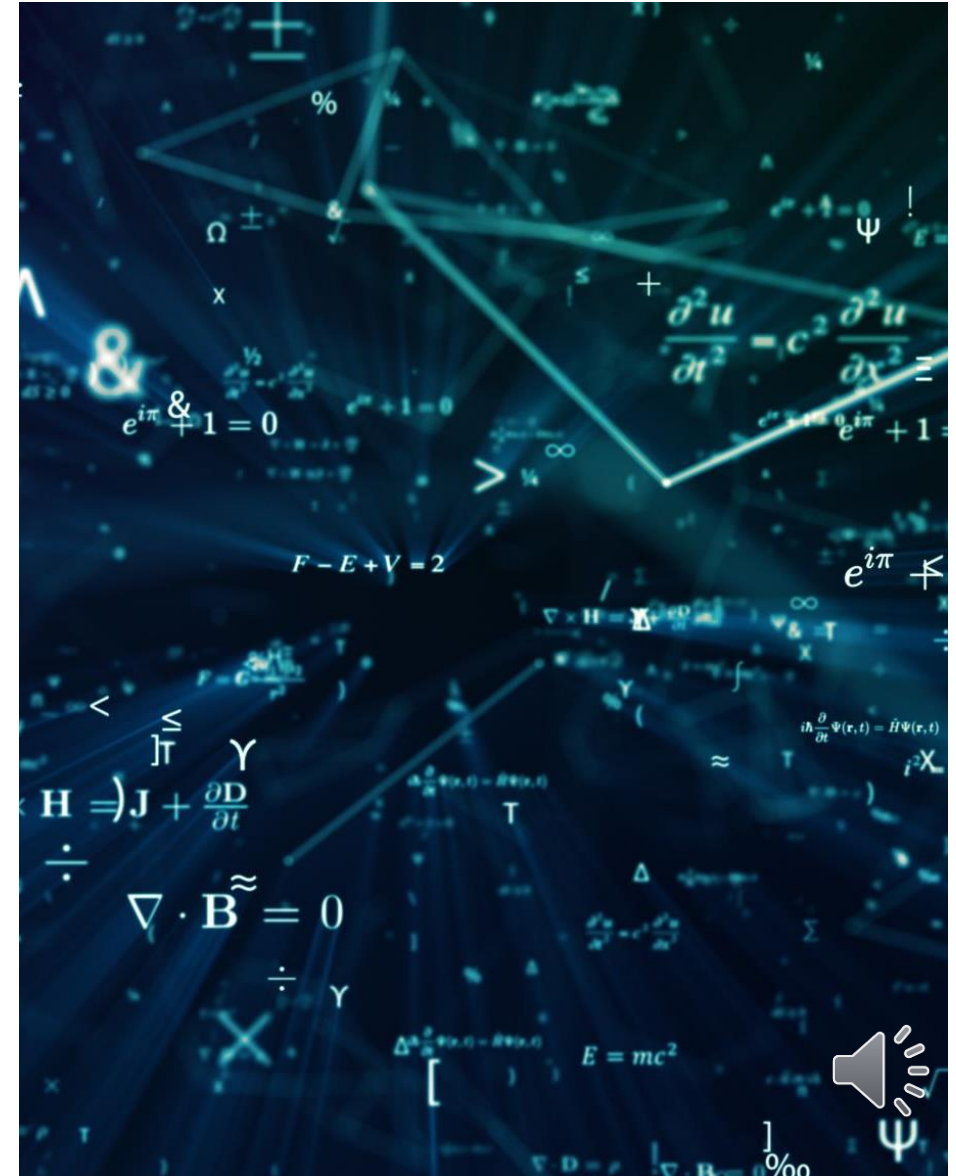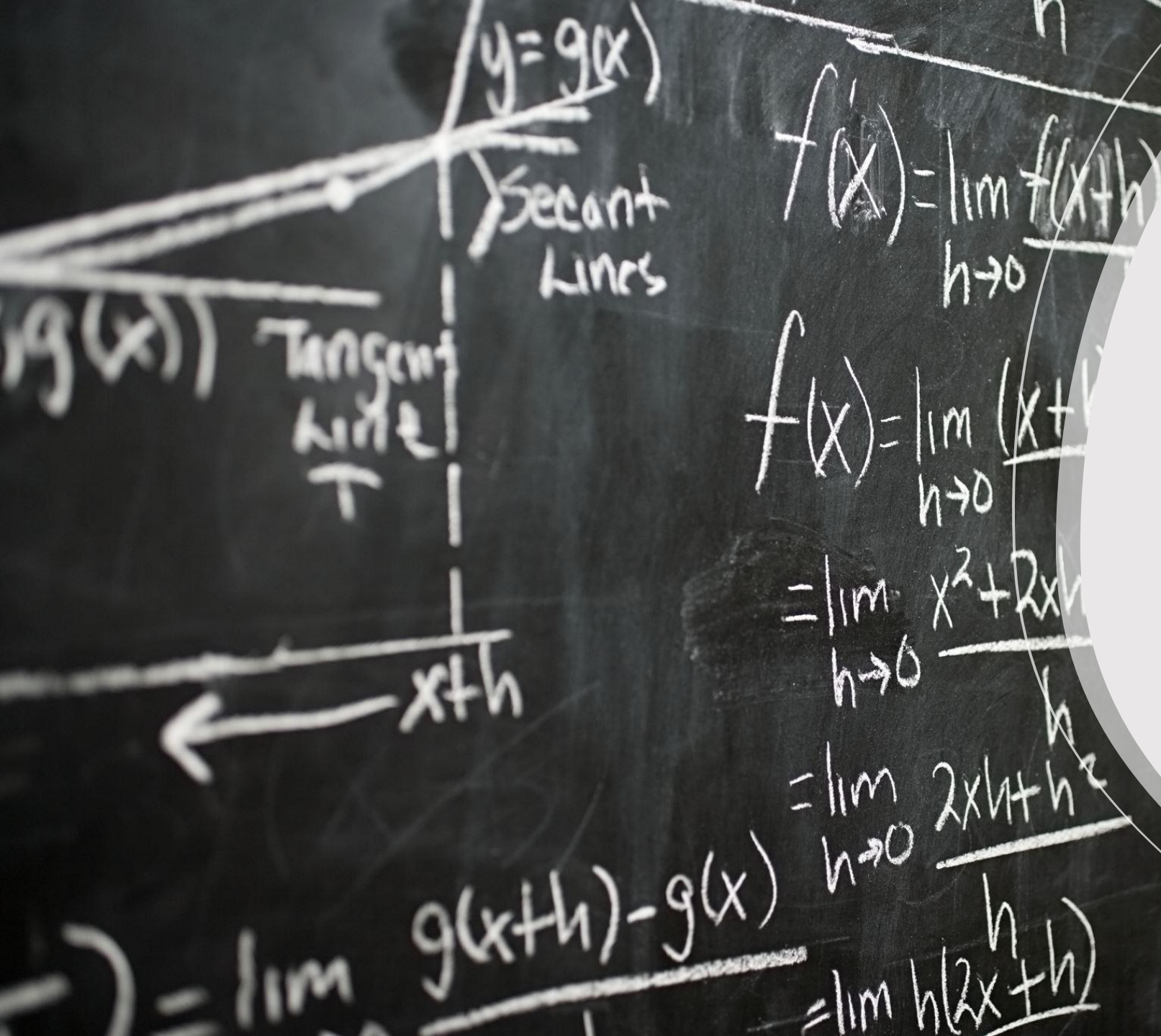
Determinant

The determinant of a square matrix is a scalar value that can provide information about the matrix properties

Eigenvalues and Eigenvectors

Eigenvalues and eigenvectors are crucial in matrix algebra. A matrix A multiplied by its eigenvector results in a scalar multiple of the same eigenvector

Matrix algebra is a fundamental tool in various mathematical and applied disciplines, providing a concise and powerful way to represent and manipulate linear relationships and transformations

Covered Points:

- Definition of Matrix Algebra

- Matrix Representation

- Basic Operations in Matrix Algebra

- Matrix Multiplication

- Identity Matrix

- Determinant

- Eigenvalues and Eigenvectors