Report

Matrix(int r, int c): Initializes a matrix with r rows and c columns.

Matrix(const Matrix &M): Copy constructor.

~Matrix(): Destructor to deallocate memory.

allocateMatrix(): Allocates memory for the matrix.

deallocateMatrix(): Deallocates memory for the matrix.

setElement(int r, int c, double e): Sets the element at position (r, c) to e.

getElement(int r, int c) const: Returns the element at position (r, c).

setSize(int r, int c): Sets the size of the matrix to r rows and c columns.

operator+, operator-, operator* for matrix-matrix and scalar-matrix operations.

operator==, operator!= for matrix comparison.

operator<< and operator>> for input/output stream operations.

The SMatrix class is a subclass of Matrix designed specifically for square matrices. It includes additional functionalities such as determinant calculation.

SMatrix(int n): Initializes an n x n square matrix.

SMatrix(const Matrix &M): Copy constructor from a general matrix.

SMatrix(const SMatrix &S): Copy constructor from another square matrix.

double determinant() const: Calculates and returns the determinant of the square matrix.

The Vector class is a specialized class for handling column vectors. It inherits from the Matrix class and includes methods specific to vectors.

Vector(int n): Initializes a vector of size n.

Vector(const Matrix &M, const int j): Copy constructor from a matrix column.

Vector(const Vector &v): Copy constructor from another vector.

setSize(int n): Sets the size of the vector.

Column Replacement:

Matrix vector_replace(int n, const Matrix &M): Replaces the n-th column of matrix M with the vector.