भारतीय प्रौद्योगिकी संस्थान तिरुपति

TIRUPATI

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI

DEPARTMENT OF MATHEMATICS

ES1101 - Computational Engineering

Lab Project - II - Matrix Operations Package

SEMESTER II Max. MARKS: 500

Write a C program to implement following tasks.

1. Get two matrices
2. Check whether the given matrix A is
   (a) row matrix
   (b) column matrix
   (c) square matrix
   (d) rectangular matrix
3. For given two matrices $A_{m\times n}$ and $B_{p\times q}$ do the following
   (a) dimension of matrices
   (b) both dimensions equal $(m = p, n = q)$
   (c) If both dimension are equal, find $A + B, A - B, kA$, where k is a constant
   (d) If $n = p$, find AB
   (e) If $n = p, q = m$, find AB and BA
   (f) If $m = n = p = q$, find AB, BA and check $AB = BA$
4. For the given matrix A
   (a) Find A^T, A^TA, AA^T
   (b) Check $A^TA = AA^T$
5. For the given square matrix A, find
   (a) diagonal matrix
   (b) identity matrix
   (c) upper triangular matrix
   (d) lower triangular matrix
   (e) triangular matrix
   (f) Find A^T, A^TA, AA^T, A^2
   (g) Check symmetric
   (h) Trace(A)
   (i) Determinant(A)
   (j) Inverse(A)
   (k) Orthogonal
   (l) Cofactor of $(i, j)^{th}$ entry