

MAT 116E Advanced Scientific and Engineering Computing

Lab-3

Q-1. Create a 3x5 matrix A, 3x3 matrix B and 4x3 matrix C by using rand() command in the interval [2,7] and make the following tasks.

- Delete the last column of A and set it to matrix new_A.
- Create a five element row vector named FiveElem that contains elements 2 through 4 of the second row of A and the elements 1 and 3 of third column of B.
- Calculate the determinant of the matrix consisting of the first two rows and columns of matrix A.
- Create a matrix D whose entries d_{ij} such that $d_{ij} = \frac{b_{ij}}{k_{ij}}$ where b_{ij} are the entries of matrix B, k_{ij} are the entries of multiplication of matrix new_A and C.

Q-2. The graph of the function $f(x) = ax^3 + bx^2 + cx + d$ passes through the points (-2.6,68), (0.5, 5.7), (1.5, 4.9) and (3.5, 88). Determine the constants a, b, c and d.

Q-3.

- It has been suggested that the population of the United States may be modeled by the formula

$$P(t) = \frac{197273000}{1 + e^{-0.03134(t-1913.25)}}$$

where t is the date in years. Write a program to compute and display the population every ten years from 1790 to 2000. Plot a graph of the population versus time.

- $y = \frac{\sin(7x) - \sin(5x)}{\cos(7x) + \cos(5x)}$ using 200 equally spaced points on the interval $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ and plot it.