Scientific Computing using Matlab

Live session - Week 4

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1. Using Newton's method to approximate, to within 10^{-4}, the value of x that produces the point on the graph of $y = x^2$ that is closest to (1,0) is (use initial as $r_0 = 1$)

A. 0.499755

B. 0.589755 ✓

C. 0.67843

D. None of these

2. Using method of False position, what is the solution accurate within 10^{-4} for the problem $x^3 + 3x^2 - 1 = 0$ on the interval $[-3, -2]$ (use end points as initial guess)

A. -2.87938 

B. 0.52234

C. -2.5278

D. None of these

3. If one of the eigenvalues of $A_{n\times n}$ is zero, it implies

A. The solution to $Ax = b$ system of equations is unique

B. The determinant of A is zero 

C. The solution to $Ax = 0$ system of equations is trivial

D. The determinant of A is nonzero

4. Which of the following step is not involved in Gauss elimination method ?

A. Elimination of Unknowns

B. Reduction to an upper triangular system

C. Finding unknowns by back substitution

D. Evaluation of cofactors 

5. Apply Gauss elimination method for solving the following equations

$$3x + 2y + 7z = 4$$
$$2x + 3y + z = 5$$
$$3x + 4y + z = 7$$

What is the value of x ?

A. 7/8 

B. 4/3

C. 9/8

D. 5/8

6. The total number of multiplication/divisions required to apply Gauss elimination method is

A. $\frac{n^3}{3} - n^2 - \frac{n}{3}$

B. $\frac{n^3}{3} + \frac{n^2}{2} - \frac{5n}{6}$ ✓

C. $\frac{n^3}{3} + n^2 - \frac{5n}{6}$

D. None of these

7. Apply Gauss Elimination method to solve the following equations

$$x_1 - x_2 + 2x_3 - x_4 = -8$$
$$2x_1 - 2x_2 + 3x_3 - 3x_4 = -20$$
$$x_1 + x_2 + x_3 = -2$$
$$x_1 - x_2 + 4x_3 + 3x_4 = 4$$

What is the value of x_1 ?

A. 1.6479

B. 4.0461

C. -7 ✓

D. -6

8. Given the linear system

$$2x_1 - 6\alpha x_2 = 3$$
$$3\alpha x_1 - x_2 = 3/2$$

What is the value of α for which the system has no solution ?

A. -1/3

B. 2/3

C. 4/3

D. None of these

9. Which of the following matrices are diagonally dominant ?

A. $\begin{pmatrix} 7 & 2 & 0 \\ 3 & 5 & -1 \\ 0 & 5 & -6 \end{pmatrix}$ 

B. $\begin{pmatrix} 6 & 4 & -3 \\ 4 & -2 & 0 \\ -3 & 0 & 1 \end{pmatrix}$

C. Both (A) and (B)

D. None of these