

Unit 6 - Week 4

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Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-10-14, 23:59 IST.

1) If one of the eigenvalues of $A_{n \times n}$ is zero, it implies 1 point

- The solution to $Ax = b$ system of equations is unique
- The determinant of A is zero
- The solution to $Ax = 0$ system of equations is trivial
- The determinant of A is nonzero

No, the answer is incorrect. Score: 0

Accepted Answers:
The determinant of A is zero

2) Which of the following step is not involved in Gauss elimination method ? 1 point

- Elimination of Unknowns
- Reduction to an upper triangular system
- Finding unknowns by back substitution
- Evaluation of cofactors

No, the answer is incorrect. Score: 0

Accepted Answers:
Evaluation of cofactors

3) Apply Gauss Elimination method to solve the following equations 1 point

$$\begin{aligned} x_1 - x_2 + 2x_3 - x_4 &= -8 \\ 2x_1 - 2x_2 + 3x_3 - 3x_4 &= -20 \\ x_1 + x_2 + x_3 &= -2 \\ x_1 - x_2 + 4x_3 + 3x_4 &= 4 \end{aligned}$$

What is the value of x_1 ?

- 1.6479
- 4.0461
- 7
- 6

No, the answer is incorrect. Score: 0

Accepted Answers:
-7

4) The total number of multiplication/divisions required to apply Gauss elimination method is 1 point

- $\frac{n^3}{3} - n^2 - \frac{n}{3}$
- $\frac{n^3}{3} + \frac{n^2}{2} - \frac{5n}{6}$
- $\frac{n^3}{3} + n^2 - \frac{5n}{6}$
- None of these

No, the answer is incorrect. Score: 0

Accepted Answers:
None of these

5) What is the principle of LU factorization method ? 1 point

- There exists no inverse for a singular matrix
- Determinant of an identity matrix is one
- Every square matrix can be expressed as a product of a lower triangular matrix and upper triangular matrix
- Every matrix can be expressed as a sum of a skew symmetric and a symmetric method

No, the answer is incorrect. Score: 0

Accepted Answers:
Every square matrix can be expressed as a product of a lower triangular matrix and upper triangular matrix

6) Apply LU factorization method for solving the following equations 1 point

$$\begin{aligned} 3x + 2y + 7z &= 4 \\ 2x + 3y + z &= 5 \\ 3x + 4y + z &= 7 \end{aligned}$$

What is the value of x ?

- $\frac{7}{8}$
- $\frac{4}{3}$
- $\frac{5}{8}$
- $\frac{7}{12}$

No, the answer is incorrect. Score: 0

Accepted Answers:
 $\frac{7}{8}$

7) Given the linear system 1 point

$$\begin{aligned} 2x_1 - 6\alpha x_2 &= 3 \\ 3\alpha x_1 - x_2 &= 3/2 \end{aligned}$$

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

- $-\frac{1}{3}$
- $\frac{2}{3}$
- $\frac{4}{3}$
- None of these

No, the answer is incorrect. Score: 0

Accepted Answers:
 $-\frac{1}{3}$

8) The LU factorization requires 1 point

- $\frac{n^3}{6} - \frac{n}{5}$ multiplication/division
- $\frac{n^3}{3} - \frac{n^2}{2} + \frac{n}{6}$ addition/subtraction
- $\frac{n^3}{5} - \frac{n^2}{3} + \frac{n}{6}$ addition/subtraction
- None of these

No, the answer is incorrect. Score: 0

Accepted Answers:
 $\frac{n^3}{3} - \frac{n^2}{2} + \frac{n}{6}$ addition/subtraction

9) Which of the following matrices are diagonally dominant ? 1 point

- $\begin{pmatrix} 7 & 2 & 0 \\ 3 & 5 & -1 \\ 0 & 5 & -6 \end{pmatrix}$
- $\begin{pmatrix} 6 & 4 & -3 \\ 4 & -2 & 0 \\ -3 & 0 & 1 \end{pmatrix}$
- Both (a) and (b)
- None of these

No, the answer is incorrect. Score: 0

Accepted Answers:
 $\begin{pmatrix} 7 & 2 & 0 \\ 3 & 5 & -1 \\ 0 & 5 & -6 \end{pmatrix}$

10) The Cholesky factorization of positive definite matrix 1 point

$$A = LL^T = \begin{pmatrix} 4 & -1 & 1 \\ -1 & 4.25 & 2.75 \\ 1 & 2.75 & 3.5 \end{pmatrix}$$

What is the matrix L ?

- $\begin{pmatrix} 2 & 0 & 0 \\ -0.5 & 2 & 0 \\ 0.5 & 1.5 & 1 \end{pmatrix}$
- $\begin{pmatrix} 2.5 & 0 & 0 \\ -1.5 & 3 & 0 \\ 0.5 & 1.5 & 2 \end{pmatrix}$
- $\begin{pmatrix} 3 & 0 & 0 \\ -0.6 & 2 & 0 \\ 2.5 & 0.5 & 1 \end{pmatrix}$
- None of these

No, the answer is incorrect. Score: 0

Accepted Answers:
 $\begin{pmatrix} 2 & 0 & 0 \\ -0.5 & 2 & 0 \\ 0.5 & 1.5 & 1 \end{pmatrix}$