

X

reviewer3@nptel.iitm.ac.in ▼

Courses » Computational Fluid Dynamics

Announcements

Course

Ask a Question

Progress

FAQ



Unit 8 - Week 7

Course outline

How to access the portal

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

- Lecture 31: Illustrative example of elimination method
- Lecture 32 : Tri-Diagonal Matrix Algorithm (TDMA)
- Lecture 33 : Elimination Methods: Error Analysis
- Lecture 34 : Elimination Methods: Error Analysis (Contd.)
- Lecture 35 : Iteration methods
- Quiz : Week 7 Assignment 7
- Feedback for Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Download Videos

Week 7 Assignment 7

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

Due on 2018-09-19, 23:59 IST

1) For L-U decomposition method, what is the order of number of calculation for forward elimination, backward substitution and L-U factorization; if the size of coefficient matrix is $n \times n$:

- (a) n^3 , n^3 and n^2
- (b) n^2 , n^2 and n^3
- (c) n^2 , n^3 and n^2
- (d) n , n^3 and n^2

- (a)
- (b)
- (c)
- (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)

1 point

2) Consider one dimensional steady state conduction without volumetric heat generation through a rod of length L . Given that at $x=0$ and $x=L$, heat flux is q W/m². Following statements are given pertaining to the numerical solution of the above problem:

- (i) Unique temperature profile cannot be obtained.
- (ii) The problem is ill-posed.
- (iii) Tri diagonal matrix algorithm (TDMA) works to solve the problem.

Which of the above statements are correct?

- (a) (i), (ii) and (iii)
- (b) (i) and (ii) only
- (c) (i) only
- (d) (ii) only

- (a)
- (b)
- (c)
- (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)

1 point

3)

1 point

Assignment
Solution

Live Session - Sep
13,2018

- (a) (i) and (ii) are correct
(b) Only (i) is correct
(c) Only (ii) is correct
(d) Neither (i) nor (ii) is correct

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(a)

- 4) For vector $x = \{1, -2, 3, -4\}$, what is the first and second norm?

- (a) 3 and $30^{1/2}$
(b) 10 and $30^{1/2}$
(c) 30 and $30^{1/2}$
(d) 10 and $10^{1/2}$

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)

- 5) For matrix A;

Statement I: $\|A\|_1 = \max$ (column sum norm) and $\|A\|_\infty = \min$ (column sum norm)

Statement II: $\|A\|_1 = \max$ (column sum norm) and $\|A\|_\infty = \max$ (row sum norm)

Statement III: $\|A\|_1 = \max$ (row sum norm) and $\|A\|_\infty = \min$ (row sum norm)

Correct the right choice regarding the statements:

- (a) Only I is correct
(b) Only II is correct
(c) Only III is correct
(d) Only I and III are correct

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)



1 po

1 point

6) Properties of matrix norm:

1 point

Statement I: $\|kA\| = |k|\|A\|$, here k is a scalarStatement II: $\|AB\| \leq \|A\|\|B\|$ and $\|A+B\| \leq \|A\| + \|B\|$ Statement III: $\|AB\| \geq \|A\|\|B\|$ and $\|A+B\| \geq \|A\| + \|B\|$

Correct the right choice regarding the statements:

- (a) Only I is correct
- (b) Only I and II are correct
- (c) Only I and III are correct
- (d) Only II is correct

- (a)
- (b)
- (c)
- (d)

No, the answer is incorrect.**Score: 0****Accepted Answers:***(b)*

7)

1 point

What is the condition number for coefficient matrix A , in the context of elimination method :

- (a) $\|A\| + \|A^{-1}\|$
- (b) $\|A\|\|A^{-1}\|$
- (c) $\|A\| - \|A^{-1}\|$
- (d) $\|A\|/\|A^{-1}\|$

- (a)
- (b)
- (c)
- (d)

No, the answer is incorrect.**Score: 0****Accepted Answers:***(b)*

8) Consider the solution of $a_i \phi_i = b_i \phi_{i+1} + c_i \phi_{i-1} + d_i$ by using Tri-diagonal matrix algorithm.

The algorithm can be written as

(a) Input a_i, b_i, c_i, d_i

$$P_1 = \frac{b_1}{a_1}; Q_1 = \frac{d_1}{a_1}$$

for i=2, N

$$P_i = \frac{b_i}{a_i + c_i P_{i-1}}; Q_i = \frac{d_i + c_i Q_{i-1}}{a_i + c_i P_{i-1}};$$

end

$$\phi_N = Q_N$$

for i= N-1, 1

$$\phi_i = P_i \phi_{i+1} + Q_i;$$

end

(b) Input a_i, b_i, c_i, d_i

$$P_1 = \frac{b_1}{a_1}; Q_1 = \frac{d_1}{a_1}$$

for i=2, N

$$P_i = \frac{b_i + c_i P_{i-1}}{a_i - c_i Q_{i-1}}; Q_i = \frac{d_i}{a_i - c_i Q_{i-1}};$$

end

$$\phi_N = Q_N$$

for i= N-1, 1

$$\phi_i = P_i \phi_{i+1} + Q_i;$$

End



(c) Input a_i, b_i, c_i, d_i

$$P_1 = \frac{b_1}{a_1}; Q_1 = \frac{d_1}{a_1}$$

for $i=2, N$

$$P_i = \frac{b_i + c_i P_{i-1}}{a_i + c_i Q_{i-1}}; Q_i = \frac{d_i}{a_i + c_i Q_{i-1}};$$

end

$$\phi_N = Q_N$$

for $i=N-1, 1$

$$\phi_i = P_i \phi_{i+1} + Q_i;$$

end

(d) Input a_i, b_i, c_i, d_i

$$P_1 = \frac{b_1}{a_1}; Q_1 = \frac{d_1}{a_1}$$

for $i=2, N$

$$P_i = \frac{b_i}{a_i - c_i P_{i-1}}; Q_i = \frac{d_i + c_i Q_{i-1}}{a_i - c_i P_{i-1}};$$

end

$$\phi_N = Q_N$$

for $i=N-1, 1$

$$\phi_i = P_i \phi_{i+1} + Q_i;$$

end

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(d)

- 9) Consider the following statements regarding Tri-diagonal matrix algorithm:
- (i) The computational load increases linearly with number of linear equations
 - (ii) The computational load increases with square of the number of linear equations
 - (iii) Coefficient matrix has to be diagonally dominant to guarantee stability
- Correct the right choice regarding the statements:
- (a) Only (i) is correct
 - (b) Only (iii) is correct
 - (c) (i) and (iii) are correct
 - (d) (ii) and (iii) are correct

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(c)



1 point

10. Consider the linear equation $Ax = b$. Let us express $A = L + D + U$, where L is a lower triangular matrix, D is a diagonal matrix and U is an upper triangular matrix. All diagonal elements of L and U matrices are zero. Using this definition, we can write:
 $Dx = -(L + U)x + b$. This yields us:

1 point

$$x^{k+1} = D^{-1} [b - (L + U)x^k]$$

Which of the following iterative methods does the above expression represent?

- (a) Jacobi iteration
(b) Gauss-Seidel
(c) both Jacobi and Gauss-Seidel
(d) Successive under-relaxation with $\omega = 0.5$

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(a)



Previous Page

End

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -

A project of



In association with



Funded by

Government of India
Ministry of Human Resource Development

Powered by

