

X

NPTEL

reviewer3@nptel.iitm.ac.in ▼

Courses » Computational Fluid Dynamics

Announcements Course Ask a Question Progress FAQ

Unit 9 - Week 8



Course outline

How to access the portal

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

- Lecture 36 : Generalized analysis of Iteration method
- Lecture 37 : Further discussion on Iterative methods
- Lecture 38 : Illustrative examples of Iterative methods
- Lecture 39 : Gradient Search based methods
- Lecture 40 : Steepest descent method (contd.)
- Quiz : Week 8 Assignment 8
- Feedback for Week 8

Week 8 Assignment 8

The due date for submitting this assignment has passed. **Due on 2018-09-26, 23:59 IST**
As per our records you have not submitted this assignment.

1) 1 point
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 Gauss-Seidel method, one can write

$$x^{i+1} = Mx^i + C$$

Choose the correct expressions for M and C

- (a) $M = -D^{-1}(L+U)$, $C = D^{-1}b$
- (b) $M = D^{-1}(L+U)$, $C = D^{-1}b$
- (c) $M = -(D+L)^{-1}U$, $C = (D+L)^{-1}b$
- (d) $M = (D+L)^{-1}U$, $C = (D+L)^{-1}b$

- a
- b
- c
- d

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

c

2) 1 point
Scarborough criteria for sufficient condition of convergence in Gauss-Seidel method is

- (a) $\frac{\sum |a_{nb}|}{|a_p|} \leq 1$; for all equations, where symbols have usual meaning
- (b) $\frac{\sum |a_{nb}|}{|a_p|} \leq 1$; for all equations
< 1; at least for one equation, where symbols have usual meaning
- (c) $\frac{\sum |a_{nb}|}{|a_p|} \geq 1$; for all equations, where symbols have usual meaning
- (d) $\frac{\sum |a_{nb}|}{|a_p|} \geq 1$; for all equations
> 1; at least for one equation, where symbols have usual meaning

- a

Week 9

Week 10

Week 11

Week 12

Download
Videos

Assignment
Solution

Live Session -
Sep 13,2018

- b
 c
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

3)

Using iterative method, one can write

$$x^{i+1} = Mx^i + C$$

Choose the correct statement

- (a) To achieve a high rate of convergence, spectral radius of convergence should be as small as possible
- (b) To achieve a high rate of convergence, spectral radius of convergence should be 1
- (c) Sufficient condition for convergence is $\max(\|M\|_R, \|M\|_C) > 1$, where the symbols have usual meaning
- (d) Sufficient condition for convergence is $\min(\|M\|_R, \|M\|_C) < 1$, where the symbols have usual meaning

- a
 b
 c
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

4)

Consider the following two set or equations

Set-1

$$x_1 + x_2 + x_3 = 3$$

$$2x_1 + 3x_2 + 4x_3 = 9$$

$$x_1 + 7x_2 + x_3 = 9$$

Set 2

$$5x_1 - 2x_2 + 3x_3 = -1$$

$$-3x_1 + 9x_2 + x_3 = 2$$

$$2x_1 - x_2 - 7x_3 = 3$$

Choose the correct statement:

- (a) Gauss Seidel method can be applied to both set of equations
- (b) Gauss Seidel method can not be applied to both set of equations
- (c) Gauss Seidel method can be applied to Set 1, while it cannot be applied to set 2.
- (d) Gauss Seidel method cannot be applied to Set 1, while it can be applied to set 2.

- a
 b
 c
 d

No, the answer is incorrect.

Score: 0

1 point 



1 point

Accepted Answers:*d*

5)

1 point

For the solution of a system of linear algebraic equations, the convergence criterion for the residuals is set to 10^{-9} . If the spectral radius of convergence is 0.9, the number of iterations using Gauss–Seidel iterative method should be greater than

- (a) 55
 (b) 112
 (c) 197
 (d) 154

- a
 b
 c
 d

No, the answer is incorrect.**Score: 0****Accepted Answers:***c*

6)

1 point

Consider the following set of equations

$$3x_1 + 7x_2 + 13x_3 = 76$$

$$x_1 + 5x_2 + 3x_3 = 28$$

$$12x_1 + 3x_2 - 5x_3 = 1$$

For getting solution, one has applied Gauss Seidel method. State which of these statements are correct.

- (a) It is not possible to apply Gauss Seidel method for getting solution
 (b) The solution will not converge since the coefficient matrix is not diagonally dominant
 (c) The solution will converge since the equations can be rewritten to make the coefficient matrix diagonally dominant
 (d) The solution will converge since coefficient matrix in the current form is diagonally dominant

- a
 b
 c
 d

No, the answer is incorrect.**Score: 0****Accepted Answers:***c*

7) Consider the following set of equations

1 point

$$2x_1 + 3x_2 + 10x_3 = 10$$

$$5x_1 - 2x_2 + 2x_3 = 5$$

$$x_1 + 10x_2 + 5x_3 = 6$$

For getting solution, one has applied Gauss Seidel method. The number of iterations to get six decimal accuracy should be greater than

(a) 35

(b) 62

(c) 26

(d) 53

a

b

c

d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

8)

1 point

Consider the following statement regarding the characteristics of a matrix.

(i) A matrix C is said to be symmetric if $C=C^T$. (C^T is the transpose of C)

(ii) A matrix C is said to be positive definite if $C=C^T$.

(iii) A matrix C is said to be symmetric if $\mathbf{v}^T C \mathbf{v} > 0$, where \mathbf{v} is any arbitrary vector.

(iv) A matrix C is said to be positive definite if $\mathbf{v}^T C \mathbf{v} > 0$, where \mathbf{v} is any arbitrary vector.

Which of the above statements are correct?

(a) (i) only

(b) (ii) only

(c) (i) and (iv)

(d) (ii) and (iii)

a

b

c

d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

9)

1 point



An analyzer tries to apply the gradient search based methods for solving the systems $Ax = b$. Consider the following statements:

- (i) Gradient search method can be applied provided that A is symmetric only
- (ii) Gradient search method can be applied provided that A is positive definite only
- (iii) Gradient search method can be applied provided that A is positive definite and symmetric
- (iv) Gradient search method can be applied provided that all the eigen values of A are negative

Which of the above statements are correct?

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

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

10)

1 point

One has applied Steepest Descent method for solving $Ax=b$. The iteration equation is written as

$$x^n = x^{n-1} + \alpha_{n-1} r_{n-1}$$

where r_{n-1} is the residual at $(n-1)^{\text{th}}$ iteration and is given by $r_{n-1} = b - Ax^{n-1}$. Choose the correct expression for α_{n-1}

- (a) $\alpha_{n-1} = \frac{r_{n-1}^T r_{n-1}}{r_{n-1}^T A r_{n-1}}$
- (b) $\alpha_{n-1} = \frac{r_{n-1}^T A r_{n-1}}{r_{n-1}^T r_{n-1}}$
- (c) $\alpha_{n-1} = \frac{r_{n-1}^T r_{n-1}}{A^T r_{n-1} A}$
- (d) $\alpha_{n-1} = \frac{A^T r_{n-1} A}{r_{n-1}^T r_{n-1}}$

- 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



Powered by

