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## Unit 8 - Week 7 : Unit 7

### Course outline

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Lecture 31 : Positive definiteness of a matrix (Contd.)

Lecture 32 : Basic Iterative Methods: Jacobi and Gauss-Siedel

Lecture 33 : Basic Iterative Methods: Matrix Representation

Lecture 34 : Convergence Rate and Convergence Factor for

### 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) 1 point  
If  $A$  is a symmetric positive definite matrix, which one can be a set of Eigen value of  $A$

- a)  $2 + 3i, 2 - 3i, 4$   
b)  $2 + 3i, 2 - 3i, -4$   
c)  $2, -3, 4$   
d)  $2, 3, 4$

- a)  
 b)  
 c)  
 d)

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

d)

2) 1 point  
 $A = R^T R$  is a positive definite matrix. What can be said about the solution of  $Rx = b$

- a) It may have infinite solution  
b) It has unique solution  
c) It may have no solution  
d) None of the above

- a)

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Accepted Answers:

c)

3)

1 point

If  $A = \begin{bmatrix} 2 & 4 \\ 5 & 3 \end{bmatrix}$ , find the spectral condition number of  $A$ 

a) 12.25

b) 3.5

c) 1.125

d) 0.285

 a) b) c) d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

b)

4)

1 point

Check for which matrix  $A$ ,  $Ax = b$  can be solved using Gauss-Siedel method

a)  $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 7 & 8 \\ 9 & 10 & 11 \end{bmatrix}$

b)  $A = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 0 \\ 0 & 1 & 1 \end{bmatrix}$

c)  $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 3 \\ 1 & 4 & 1 \end{bmatrix}$

d)  $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$

 a) b) c) d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

b)

5) In which case the iteration step  $x^{k+1} = ax^k + t$  will not converging 1 pointa)  $a$  is asymmetricb)  $a$  is diagonally dominantc)  $a$  is singular

d) None of the above

 a) b)

c) d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

6)

1 point

Rate of convergence is a basic iterative process of  $Ax = b$  directly depends

- a) Spectral condition number of  $A$ .
- b) condition number of  $A$ .
- c) Spectral condition number of iterative matrix  $A$ .
- d) Spectral radius of iterative matrix  $A$ .

 a) b) c) d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

d)

7)

1 point

If the iteration matrix has largest eigen value 0.9.what can be the optimum SOR

- a) 1.21
- b) 1.84
- c) 1.39
- d) 1.04

 a) b) c) d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

8)

1 point

What is the range of relaxation factor for a successive under relaxation

- a)  $\omega \leq 1.5$
- b)  $\omega \leq 1$
- c)  $\omega = 1$
- d)  $\omega = 2$

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

b)

9) With which SOR factor an iterative matrix is bond to diverge 1 point

- a)  $\omega = 1$
- b)  $\omega < \omega_{opt}$
- c)  $\omega > \omega_{opt}$
- d)  $\omega = 2$

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

d)

10) Which of the following matrix cannot be solved using SOR 1 point

- a) Identity matrix
- b) Permutation matrix
- c) SPD matrix
- d) Diagonally Dominant matrix

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

b)

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