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Unit 9 - Week 8 : Unit 8

Course outline

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Lecture 36 :
Steepest Descent
Method:
Finding Minima of a Functional

Lecture 37 :
Steepest Descent
Method:
Gradient Search

Lecture 38 :
Steepest Descent
Method:
Algorithm and Convergence

Week 8 Assignment 8

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-26, 23:59 IST.**

1) In which case a functional J will have a minima? 1 point

a) $\nabla^2 J > 0$

b) $\nabla^2 J = 0$

c) $\nabla^2 J \leq 0$

d) $\nabla^2 J < 0$

a

b

c

d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

2) The direction on which a function f will have largest rate of increase is: 1 point

a) $\text{div}(f)$

b) $-\text{grad}(f)$

c) $\text{grad}(f)$

d) $\tan^{-1}(f_y/f_x)$

a

b

c

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3) For any positive definite matrix A , minimization of $J(x) = \frac{1}{2}x^T Ax - bx$ will give solution of 1 point

- a) $Ax=b$
 b) $1/2(A^T+A)x = b$
 c) $AA^T x=b$
 d) None of the above

- a
 b
 c
 d

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

4) If the k -th iteration residual in a steepest descent algorithm is $r_k=b-Ax_k$ then 1 point

- a) r_k is unit vector
 b) r_k and r_{k+1} are orthogonal
 c) $|r_k| > |r_{k+1}|$
 d) $Ar_k=0$

- a
 b
 c
 d

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

5) Minimum residual iterative method is an 1 point

- a) orthogonal one-dimensional projection method
 b) orthogonal and multi-dimensional projection method
 c) oblique and one-dimensional projection method
 d) oblique and multi-dimensional projection method

- a
 b
 c
 d

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

c

6) Rate of convergence in a residue norm method depends on

1 point

- a) Spectral condition number of A .
- b) condition number of A .
- c) Spectral condition number of A^T .
- d) Spectral condition number $A^T A$.

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

d

7)

1 point

 $A = B - B^T$. B is not symmetric, Which of the iterative methods will work for $Ax = d$?

- a) Steepest descent
- b) Jacobi
- c) Residue norm
- d) Minimum residue

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

8) Which of the iterative methods minimize the L_2 norm of $b - Ax$

1 point

- a) Residue norm
- b) Minimum residue
- c) Steepest descent
- d) Conjugate gradient

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

9) A steepest descent algorithm contains

1 point

- a) Only vector vector products
- b) Matrix-vector and vector-vector products
- c) Recursive relations
- d) All of the above

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

10)

1 point

Which method may not work for a diagonally dominant matrix with all positive elements

- a) Gauss-Seidel
- b) Minimum residual
- c) Residue norm
- d) Steepest descent

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

d

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