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NPTEL

Courses » **Matrix Solvers**

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Unit 13 - Week 12

Course outline

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○ Lecture 56 : Preconditioners

○ Lecture 57 : Preconditioned conjugate gradient

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○ Lecture 60 : Multigrid methods

Week 12 Assignment 12

The due date for submitting this assignment has passed.   **Due on 2018-10-24, 23:59 IST.**
As per our records you have not submitted this assignment.

1)   Why preconditions are used?   *1 point*
    a) To reduce number of operations in each step
    b) To use direct solution technique
    c) For better parallelization
    d) For faster convergence

○ a)

○ b)

○ c)

○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

2)   Which of the following is a left preconditioned form of $Ax = b$?   *1 point*
    a) $M^{-1}Ax = b$
    b) $M^{-1}Ax = M^{-1}b$
    c) $AM^{-1}u = b$
    d) $M^{-1}AM^{-1}u = M^{-1}b$

○ a)

○ b)

○ c)

○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

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Which of the following can give a symmetric preconditioning?

a) $M = LDU$

b) $M^{-1} = UL$

c) $M = LL^T$

d) All of these

○ a)

○ b)

○ c)

○ d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

4)   *1 point*

The operations during iterations for left and right preconditioning of a conjugate gradi method are essentially same.

a) True

b) False

○ a)

○ b)

No, the answer is incorrect.

Score: 0

Accepted Answers:

a)

5)   *1 point*

Which of the following Krylov subspaces describe the solution update space K_m for a preconditioned GMRES?

a) $K_m = K(A, r_0)$

b) $K_m = K(A, M^{-1}r_0)$

c) $K_m = K(M^{-1}A, r_0)$

d) $K_m = K(AM^{-1}, r_0)$

○ a)

○ b)

○ c)

○ d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

6)   *1 point*

Which of the following iterates can produce a symmetric preconditioning?
   a) Gauss-Seidel
   b) ADI
   c) Symmetric SOR
   d) Minimum residual

   ○ a)
   ○ b)
   ○ c)
   ○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

7)   *1 point*

For Jacobi iteration of finite difference matrix, the spectral radius of the iteration mat
is higher for
   a) Lower grid spacing
   b) Lower number of grid points
   c) Higher boundary values
   d) Lower convergence criterion

   ○ a)
   ○ b)
   ○ c)
   ○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

8)   *1 point*

For iterative solution of Laplace equation by finite difference method,
   a) Higher number grid points will have lower number of operations per iterati
       step.
   b) Lower number of grid points will have lower number of operations per iterati
       step.
   c) Higher number of grid points will take lower number of iteration steps
       convergence.
   d) None of the above

   ○ a)
   ○ b)
   ○ c)
   ○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:

Wednesday 07 November 2018 03:00 PM

b)

9) Which of the following is not a multigrid step?   *1 point*

    a) Domain decomposition
    b) Relaxation
    c) Prolongation
    d) Restriction

    ○ a)
    ○ b)
    ○ c)
    ○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

10)   *1 point*

In which of the multigrid cycle, relaxation may be done in a coarser grid level for mc
than once?

    a) V-cycle
    b) W-cycle with more than two grid levels
    c) W-cycle with a single grid level
    d) Full-multigrid

    ○ a)
    ○ b)
    ○ c)
    ○ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

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