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NPTEL

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Courses » Introduction to Finite Volume Methods II

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Unit 3 - Week 2 - Linear solvers + Convection term discretisation

Register for Certification exam

Assignment 2

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

Due on 2019-02-13, 23:59 IST.

1) For solving $A\phi = b$ using an iterative solver such that $\phi^{(n)} = B\phi^{(n-1)} + Cb$. Which is true? *1 point*

- $B + CA = I$ ensures that the solution will not change with subsequent iterations once exact solution is reached.
- Spectral radius of B should be less than 1
- Some sort of stopping criteria is necessary for checking convergence of the iterations.
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

2) For Jacobi method, $M\phi^{(n)} = N\phi^{(n-1)} + b$ is used to solve $A\phi = b$ and A is written as $A = L + D + U$, then *1 point*

- $M = D$ and $N = L + U$
- $M = D^{-1}$ and $N = L + U$
- $M = (D + L)$ and $N = U$
- $M = (D + L)^{-1}$ and $N = U$

No, the answer is incorrect.
Score: 0

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$M = D$ and $N = L + U$

$M = D^{-1}$ and $N = L + U$

$M = (D + L)$ and $N = U$

$M = (D + L)^{-1}$ and $N = U$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$M = (D + L)$ and $N = U$

4) If $\bar{L}$ is the factorized sparse lower triangular matrix for a symmetric matrix A obtained using **ILU(0)** factorization, then the preconditioning matrix P for A is given by *1 point*

$\bar{L}$

$\bar{L}^T$

$\bar{L}\bar{L}^T$

$\bar{L}^T\bar{L}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\bar{L}\bar{L}^T$

5) What is the advantage of using **ILU(0)** factorization? *1 point*

- Preconditioner has only twice the size of the original matrix
- It mimics the non-zero sparsity of the original matrix
- Convergence of the iterative method remains same compared with complete **LU** factorization
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
It mimics the non-zero sparsity of the original matrix

6) Which is true for **DILU** factorization? *1 point*

- In the **DILU** factorization the fill-in of the off-diagonal elements is eliminated and only the diagonal elements are modified
- **DILU** uses more memory than other **ILU** factorizations
- Both of the above
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
*In the **DILU** factorization the fill-in of the off-diagonal elements is eliminated and only the diagonal eleme are modified*

7) Necessary condition for using gradient methods for solving system of linear equations $\boldsymbol{Ax} = \boldsymbol{b}$ **_1 point_**

Matrix $\boldsymbol{A}$ should be symmetric

Matrix $\boldsymbol{A}$ should be positive definite

The quadratic minimization function $Q(\phi)$ has a global minimum

All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

8) If matrix $\boldsymbol{P}$ and $\boldsymbol{A}$ are symmetric, then $\boldsymbol{P}^{-1}\boldsymbol{A}$ is **_1 point_**

Necessarily symmetric

Maybe symmetric

Necessarily anti-symmetric

Diagonal matrix

No, the answer is incorrect.
Score: 0

Accepted Answers:
Maybe symmetric

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