Remember in your precious prayers

(24) The acceleration factor ω in SOR method lies between [1, 2]

(25) In the eqv. below, when SOR method is applied on 2D Laplace eqv. $u_{ij}^{(n+1)} = u_{ij}^{(n)} + \frac{\omega}{4} R_{i,j}$, the parameter ω represents the acceleration factor.

(26) Guass-Seidel method is a special case of SOR method if acceleration method $\omega = 1$.

Jacobi's method

(20) Guass-Seidel method requires more iterations than Jacobi's method. False

(21) Which step is not involved in factorization process?
elimination of unknown using back substitution

(22) Which is name of factorization method?
Doolittle's method

(23) The diagonal 5-point formula when applied on Laplace eqv. remains an invariant on coordinate axes.

(28) Alternating Direction Implicit (ADI) method is iterative method.

(29) The ADI method represented by the equation
$u_{i,j}^{(n+1)} - 4u_{ij}^{(n+1)} + u_{i+1,j}^{(n+1)} = -u_{i,j-1}^{(n)} - u_{i,j+1}^{(n)}$
is used to compute the values at all internal mesh points along the rows.

(30) The diagonal 5-point formula is obtained when coordinate axis is rotated through an angle of 45 degree.

(31) The discretized PDE $u_i^{(n+1)} = 2(1 - r^2c^2)u_i^n + r^2c^2(u_{i-1}^n + u_{i+1}^n) - u_i^{n-1}$ is a three level explicit

SOR for Jacobi's method for Poisson eq:

$$U_{ij}^{(n+1)} = \frac{1}{4}\omega\left[U_{i-1,j}^{(n)} + U_{i+1,j}^{(n)} + U_{i,j-1}^{(n)} + U_{i,j+1}^{(n)} + h^2 f_{ij}(x,y)\right] + (1-\omega)U_{ij}^{(n)}$$

SOR for Gauss Seidal method for Poisson eq:

$$U_{ij}^{(n+1)} = \frac{1}{4}\omega\left[U_{i-1,j}^{(n+1)} + U_{i+1,j}^{(n)} + U_{i,j-1}^{(n+1)} + U_{i,j+1}^{(n)} + h^2 f_{ij}(x,y)\right] + (1-\omega)U_{ij}^{(n)}$$

Internal mesh points by latest (n+1)th iteration:

For Jacobi's

$$U_{ij}^{(n+1)} = \frac{1}{4}\omega\left[U_{i-1,j}^{(n)} + U_{i+1,j}^{(n)} + U_{i,j-1}^{(n)} + U_{i,j+1}^{(n)} + h^2 f_{ij}(x,y)\right]$$

(16) The discretized form of 2D Poisson PDE when central difference approximation is applied on both derivative with uniform step size $h=0.5$ in both directions is

$$4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$$

(17) The solution of eliptical eq. depends on all of its boundries

(18) Which is an elliptic PDE? Laplace equation

(19) Guass-Seidel method is similar to which of method. Jacobi's method

can be obtained from boundary condition.

(34) Damped wave equation is hyperbolic PDE.

(35) Which is not a type of flows based on their mathematical behaviour? circular

(36) The PDE is classified as $5\frac{\partial^2 u}{\partial x^2} + 6\frac{\partial^2 u}{\partial y^2} = xy$

elliptic.

prepared by Fatima Ali

(37) The method of lines (MOL) is generally used for

(32) Telegraph PDE is a type of hyperbolic PDE.

(33) While solving a Hyperbolic PDE the first-level solution can be obtained from boundary condition.

(34) Damped wave equation is hyperbolic PDE.

(35) Which is not a type of flows based on their mathematical behaviour? circular

(36) The PDE is classified as $5\frac{\partial^2 u}{\partial x^2} + 6\frac{\partial^2 u}{\partial x \partial y} - x u$

(38) In MOL, finite difference approximations for special derivatives are used to convert a PDE to a large set of ordinary differential equation.

(39) The region in which PDE

$$x^3 \frac{\partial^2 u}{\partial x^2} + 3\frac{\partial^2 u}{\partial x \partial y} + 27\frac{\partial^2 u}{\partial y^2} = 0$$

acts as an elliptic equation is $b^2 - 4ac$

(25) ... eq. below, when SOR method is applied on 2D Laplace eqn. $u_{ij}^{(n+1)} = u_{ij}^{(n)} + \frac{\omega}{4} R_{i,j}$, the parameter ω represents the acceleration factor.

(26) Guass-Seidel method is a special case of SOR method if acceleration method $\omega = 1$.

(27) The SOR method is more powerful iterative method than both Jacobi & Guass-Seidel method.

(28) Alternating Direction Implicit (ADI) method is iterative method.

(29) The ADI method represented by the ...

(18) Which is an elliptic PDE? Laplace equation

(19) Guass-Seidel method is similar to which of method.
Jacobi's method

(20) Guass-Seidel method requires more iterations than Jacobi's method. False

(21) Which step is not involved in factorization process?
elimination of unknown using back substitution

(22) Which is name of factorization method?

$$u_{i-1,j}^{(n+1)} - 4u_{i,j}^{(n+1)} + u_{i+1,j}^{(n+1)} = -u_{i,j-1}^{(n)} - u_{i,j+1}^{(n)}$$

is used to compute the values at all internal mesh points along the rows.

(30) The diagonal 5-point formula is obtained when coordinate axis is rotated through an angle of 45 degree.

(31) The discretized PDE $u_i^{(n+1)} = 2(1-r^2c^2)u_i^n + r^2c^2(u_{i-1}^n + u_{i+1}^n) - u_i^{n-1}$ is a three level scheme.

(37) The method of lines (MOL) is generally used for space dependent PDE.

(38) In MOL, finite difference approximations for special derivatives are used to convert a PDE to a large set of ordinary differential equation.

(39) The region in which PDE

$$x^3\frac{\partial^2 u}{\partial x^2} + 3\frac{\partial^2 u}{\partial x \partial y} + 27\frac{\partial^2 u}{\partial y} = 0$$

(32) Telegraph PDE is a type of hyperbolic PDE.

(33) While solving a Hyperbolic PDE, the first-level solution can be obtained from boundary co...

(34) Damped wave equation is hyperbolic PDE.

(35) Which is not a type of flows based on their ...

(8) Which PDE ... scheme after applying appropriate difference approximations and $c > 0$.

$$\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$$

Donald J. Tr... DONALDJTRUMP.COM https:

Prepared by Fatima Ali

(9) A finite difference method when applied on PDE will be stable if implification factor G is bounded.

(10) The Crank-Nicolson scheme when applied on heat diffusion equation is unconditionally stable.

(11) ... diffusion equation is unconditionally stable.

(11) Laplace equation is a type of elliptical partial eq.

(12) Which equation represents 2D Laplace PDE?

$$\nabla^2 u = 0$$

Poisson

(13) The discretized form of 2D Laplace PDE for uniform grid spacing in both direction is given by:

$$4w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$$

(14) Consider the mesh point $w_j = w_{i,j}$ of ... solution ...

(8) Which PDE generates First Order upwind scheme after applying appropriate difference approximations and $c > 0$.

$$\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$$

Prepared by Fatima Ali

(9) A finite difference method when applied on PDE will be stable if implification factor G is bounded.

(10) The Crank-Nicolson scheme when applied on heat diffusion equation is unconditionally stable.

(5) Which inequality is sufficient condition for convergence of Jacobi's iterative method?

$$|a_{ii}| \geq \sum_{i \neq j} |a_{i,j}| \quad , i = 1, 2, \ldots, n$$

(4) The Schmidt method applied on 1D heat equation is a two level scheme.

(3) The Crank-Nicolson method is unconditionaly stable for unsteady diffusion equation.

(6) Another name of Jacobi's iterative method is displacement method.

(6) Another name of Jacobi's iterative method is displacement method.

(7) The process of constructing a sequence and obtaining the solution of a system using specified accuracy is called iteration.

MCQs

Prepared by
Fatima Ali

MP

(1) Which of the following formulas is used to compute lower triangular matrix entries in Crout's algorithm?

$$l_i = a_i - \frac{c_{i-1}}{l_{i-1}} b_i \text{, for } i = 1, 2, 3, \ldots, n$$

(2) In Crout's method of LU factorization matrix, U has 1's on its diagonal.

(5) Which inequality is sufficient condition for convergence

(14) Consider the mesh point $w_i = w_{ij}$ of solution domain, where I denotes the labeling to internal grid points and I is defined as $I = j + (m-1-j)(n-1)$

(15) The discretized form of 2D Poisson PDF when Central difference approximation is applied on both derivatives with uniform step size $h = 0.5$ in

Question # 6 of 10 (Start time: 06:45:42 PM, 18 July 2023)

Total Marks: 1

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$ correct 100
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

Maths with Fatima Ali

1:05 AM

vulms.vu.edu.pk/Quiz/QuizSt

MTH646 - Partial Differential Equations (Quiz#1) **Total Questions :10**

Please read the following instructions carefully!

1. Quiz will be based upon Multiple Choice Questions (MCQs).

2. You have to attempt the quiz online. You can start attempting the quiz any time within given date(s) of a particular subject by clicking the link for Quiz in VULMS.

3. Each question has a fixed time of 90 seconds. So you have to save your answer before 90 seconds. But due to unstable internet speeds, it is recommended that you should save your answer within 60 seconds. While attempting a question, keep an eye on the remaining time.

4. Attempting quiz is unidirectional. Once you move forward to the next question, you can not go back to the previous one. Therefore before moving to the next question, make sure that you have selected the best option.

5. **DO NOT** press **Back Button** / **Backspace Button** while attempting a question, otherwise you will lose that question.

6. **DO NOT** refresh the page unnecessarily, **specially** when following messages appear
   Saving...
   Question Timeout: Now loading next question...

7. **Javascript MUST be enabled** in your browser; otherwise you will not be able to attempt the quiz.

8. If for any reason, you lose access to internet (like power failure or disconnection of internet), you will be able to attempt the quiz again from the question next to the last shown question. But remember that you have to complete the quiz before expiry of the deadline.

9. If any student failed to attempt the quiz in given time then no re-take or offline quiz will be held.

Important Announcement

1. It has come to the University's knowledge that some students are using unfair means while attempting their quiz.

2. The University is monitoring & analyzing the quiz attempts and if a student is found involved in using unfair means, i.e., helping tools/software, Web Extension, Add-ons etc., an Unfair Means Case (UMC) will be made against such student(s) including cancellation of their quiz.

Start Quiz

FOR PAID 03066793776

1:05 AM

vulms.vu.edu.pk/Quiz/QuizQ

MC210400866: ZAHID IQBAL

Time Left 82 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 1 of 10 (Start time: 01:03:21 PM, 19 July 2023)

Total Marks: 1

Gauss-Seidel method is also known as..... Method

Select the correct option

Reload Math Equations

- Gauss elimination
- Successive displacement
- Jacobi's iterative
- Gauss Jorden

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:05 AM

vulms.vu.edu.pk/Quiz/QuizQ

8

MC210400866: ZAHID IQBAL

Time Left 84 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 2 of 10 (Start time: 01:03:35 PM, 19 July 2023)

Total Marks: 1

Poisson's partial differential equation is a type of_____ partial equation.

Select the correct option

Reload Math Equations

- (●) Elliptical
- ( ) None of these
- ( ) Parabolic
- ( ) Hyperbolic

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:05 AM

vulms.vu.edu.pk/Quiz/QuizQ

MC210400866: ZAHID IQBAL

Time Left 79 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 3 of 10 (Start time: 01:03:47 PM, 19 July 2023)

Total Marks: 1

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is .....

Select the correct option

Reload Math Equations

- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4 f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:06 AM

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MC210400866: ZAHID IQBAL

Time Left 77 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 4 of 10 (Start time: 01:04:05 PM, 19 July 2023)

Total Marks: 1

Consider the mesh point $w_l = w_{i,j}$ *of the solution domain*

where l *denotes the labeling to the* internal grid points *and* $l =$

Select the correct option

Reload Math Equations

○	$i + (m + 1 + j)(n - 1)$
○	$j + (m - 1 - i)(n - 1)$
●	$i + (m - 1 - j)(n - 1)$
○	$i + (n - 1 - j)(m - 1)$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:06 AM

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MC210400866: ZAHID IQBAL

Time Left 84 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 5 of 10 (Start time: 01:04:24 PM, 19 July 2023)

Total Marks: 1

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c > 0$

Select the correct option

Reload Math Equations

- Forward difference
- Central difference
- Crank-Nicolson scheme
- Backward difference

Click to Save Answer & Move to Next Question

FOR PAID 03066799376

1:06 AM

vulms.vu.edu.pk/Quiz/QuizQ

8

MC210400866: ZAHID IQBAL

Time Left 85 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 6 of 10 (Start time: 01:04:38 PM, 19 July 2023)

Total Marks: 1

A finite difference scheme will be stable if the amplification factor G satisfied the following condition,

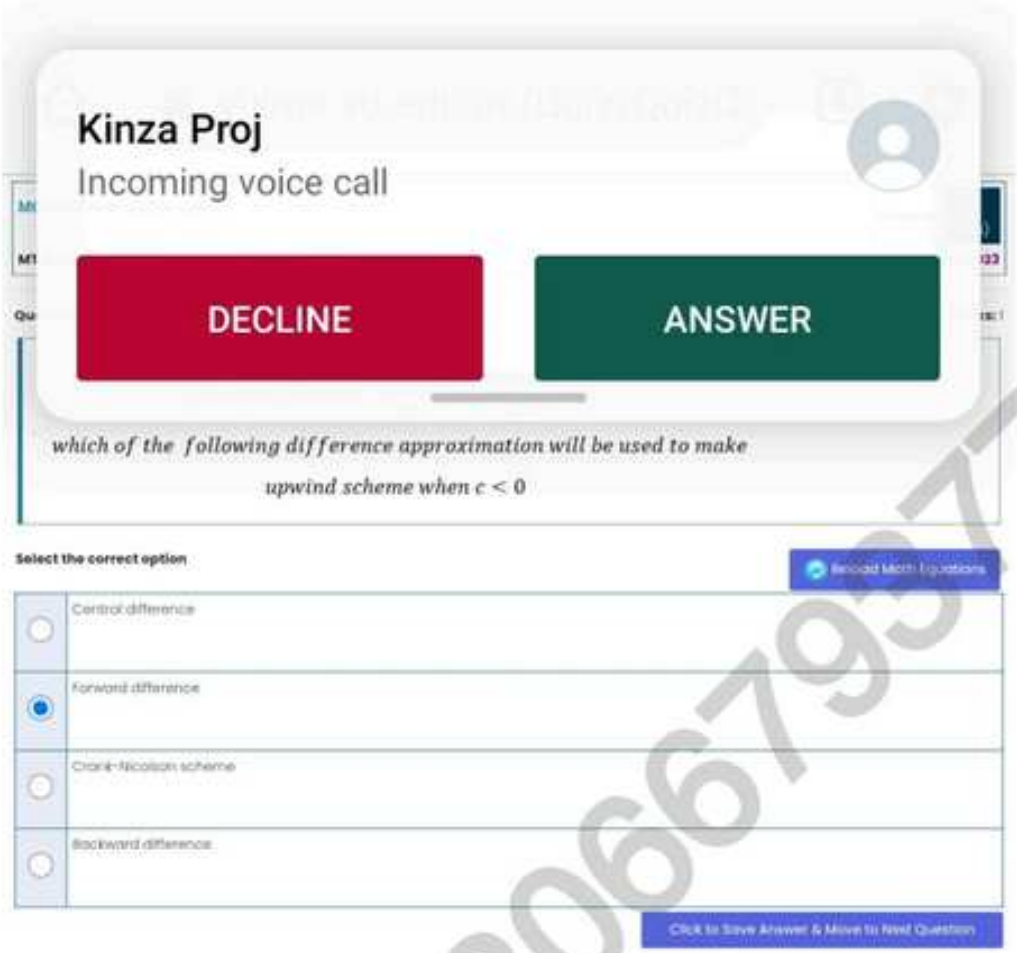
Select the correct option

Reload Math Equations

- $|G| < 1$
- $|G| \geq 1$
- $|G| = 1$
- $|G| \leq 1$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776



FOR PAID 03066795776

1:06 AM

vulms.vu.edu.pk/Quiz/QuizQ

MC210400866: ZAHID IQBAL

Time Left 86 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 8 of 10 (Start time: 01:05:00 PM, 19 July 2023)

Total Marks: 1

A finite difference method when applied on PDE will be stable if the amplification factor G is ....

Select the correct option

Reload Math Equations

- Bounded
- None of these
- Unbounded
- Unrestrained

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:07 AM

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MC210400866: ZAHID IQBAL

Time Left 83 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 9 of 10 (Start time: 01:05:11 PM, 19 July 2023)

Total Marks: 1

The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

Select the correct option

Reload Math Equations

- $2(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$
- $4(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$
- $4(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$
- $2(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:07 AM

vulms.vu.edu.pk/Quiz/QuizQ

8

MC210400866: ZAHID IQBAL

Time Left 85 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:03 PM, 19 July 2023

Question # 10 of 10 (Start time: 01:05:24 PM, 19 July 2023)

Total Marks: 1

The Crank-Nicolson scheme when applied on heat diffusion equation is .....

Select the correct option

Reload Math Equations

- Conditionally stable
- Neither stable nor bounded
- Unconditionally stable
- None of these

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:11 AM

vulms.vu.edu.pk/Quiz/QuizQ

MC210402379: SOBIA ASLAM

Time Left 83 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 1 of 10 (Start time: 01:09:21 PM, 19 July 2023)

Total Marks: 1

The Crank-Nicolson scheme when applied on heat diffusion equation is .....

Select the correct option

Reload Math Equations

- None of these
- Unconditionally stable
- Neither stable nor bounded
- Conditionally stable

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:11 AM
vulms.vu.edu.pk/Quiz/QuizQ
8

MC210402379: SOBIA ASLAM

Time Left 79 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 2 of 10 (Start time: 01:09:35 PM, 19 July 2023)

Total Marks: 1

Consider the mesh point $w_l = w_{i,j}$ *of the solution domain*

where l *denotes the labeling to the* internal grid points *and* $l =$

Select the correct option

Reload Math Equations

- $j + (m - 1 - i)(n - 1)$
- $i + (m - 1 - j)(n - 1)$
- $i + (n - 1 - j)(m - 1)$
- $i + (m + 1 + j)(n - 1)$

Click to Save Answer & Move to Next Question

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MC210402379: SOBIA ASLAM

Time Left 84 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 3 of 10 (Start time: 01:09:52 PM, 19 July 2023)

Total Marks: 1

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c > 0$

Select the correct option

Reload Math Equations

- Crank-Nicolson scheme
- Forward difference
- Central difference
- Backward difference

Click to Save Answer & Move to Next Question

FOR PAID 03066799376

1:11 AM

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8

MC210402379: SOBIA ASLAM

Time Left 83 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 4 of 10 (Start time: 01:10:04 PM, 19 July 2023)

Total Marks: 1

Which of the following equation represents 2D Poisson partial differential equation?

Select the correct option

Reload Math Equations

- $\nabla u = 0$
- $\nabla^2 u = 0$
- $\nabla^2 u = f(x, y)$
- $\nabla u = f(x)$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:12 AM

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MC210402379: SOBIA ASLAM

Time Left 86 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 5 of 10 (Start time: 01:10:18 PM, 19 July 2023)

Total Marks: 1

A finite difference method when applied on PDE will be stable if the amplification factor G is ....

Select the correct option

Reload Math Equations

- Bounded
- Unbounded
- Unrestrained
- None of these

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:12 AM

vulms.vu.edu.pk/Quiz/QuizQ

8

MC210402379: SOBIA ASLAM

Time Left 81 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 6 of 10 (Start time: 01:10:28 PM, 19 July 2023)

Total Marks: 1

Which of the following equation represents 2D Laplace partial differential equation?

Select the correct option

Reload Math Equations

- $\nabla^2 u = f(x, y)$
- $\nabla^2 u = 0$
- $\nabla u = 0$
- $\nabla u = f(x)$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:12 AM

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MC210402379: SOBIA ASLAM

Time Left 84 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 10 July 2023

Question # 7 of 10 (Start time: 01:10:44 PM, 10 July 2023)

Total Marks: 1

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4\, f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4}\, f_{i,j}$
- (selected) $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$
- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:12 AM

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MC210402379: SOBIA ASLAM

Time Left 85 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 15 July 2023

Question # 8 of 10 (Start time: 01:10:57 PM, 15 July 2023)

Total Marks: 1

Gauss-Seidel method is also known as..... Method

Select the correct option

Reload Math Equations

- Successive displacement
- Gauss Jorden
- Gauss elimination
- Jacobi's iterative

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

1:13 AM

vulms.vu.edu.pk/Quiz/QuizQ

8

MC210402379: SOBIA ASLAM

Time Left 85 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 9 of 10 (Start time: 01:11:08 PM, 19 July 2023)

Total Marks: 1

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c < 0$

Select the correct option

Reload Math Equations

- Central difference
- Crank-Nicolson scheme
- Backward difference
- Forward difference

Click to Save Answer & Move to Next Question

FOR PAID 03066795376

1:13 AM

vulms.vu.edu.pk/Quiz/QuizQ

MC210402379: SOBIA ASLAM

Time Left 79 sec(s)

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01:09 PM, 19 July 2023

Question # 10 of 10 (Start time: 01:11:20 PM, 19 July 2023)

Total Marks: 1

Which of the following discretized factor is utilized to check the stability of finite difference scheme in Fourier transform

Select the correct option

Reload Math Equations

- $u_{i,j} = G^j e^{Ikx}$
- $u_{i,j} = G^j e^{Ik\Delta y}$
- $u_{i,j} = G^i e^{Ikx}$
- $u_{i,j} = G^j e^{I\Delta x}$

Click to Save Answer & Move to Next Question

FOR PAID 03066793776

MTH646 - Partial Differential Equations (Quiz#1) Quiz St

Question # 1 of 10 (Start time: 05:39:13 PM, 18 July 2023)

$$\text{Consider the PDE } \frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$$

which of the following difference approximation will be used to make upwind scheme when $c > 0$

Select the correct option

- Forward difference
- Backward difference
- Central difference
- Crank-Nicolson scheme

correct 💯

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 2 of 10 (Start time: 05:40:11 PM, 18 July 2023) Total Marks: 1

Which of the following equation represents 2D Laplace partial differential equation?

Select the correct option

Reload Math Equations

- $\nabla u = 0$
- $\nabla^2 u = 0$
- $\nabla u = f(x)$
- $\nabla^2 u = f(x,y)$

correct 💯

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MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 05:39 PM, 18 July 2023

Question # 3 of 10 (Start time: 05:41:50 PM, 18 July 2023)

Total Marks: 1

The discretized form of 2D Laplace PDE for the uniform grid spacing in both direction is given by the equation,

Select the correct option

Reload Math Equations

- $4w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$ correct 💯
- $w_{i,j} = 4[w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$
- $w_{i,j} = 4[(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$
- $4w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 05:39 PM, 18 July 2023

Question # 4 of 10 (Start time: 05:43:24 PM, 18 July 2023)

Total Marks: 1

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$ correct 💯
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4 f_{i,j}$
- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 5 of 10 (Start time: 05:45:16 PM, 18 July 2023) Total Marks: 1

Which of the following discretized factor is utilized to check the stability of finite difference scheme in Fourier transform,

Select the correct option

Reload Math Equations

- $u_{i,j} = G^j e^{Ik\Delta y}$
- $u_{i,j} = G^j e^{Ikx}$ correct 💯
- $u_{i,j} = G^j e^{I\Delta x}$
- $u_{i,j} = G^i e^{Ikx}$

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Click to Save Answer & Move to Next Question

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 6 of 10 (Start time: 05:45:42 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$ correct 💯
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1)

Question # 7 of 10 (Start time: 05:47:07 PM, 18 July 2023)

Gauss-Seidel method is also known as..... Method.

Select the correct option

- ○ Jacobi's iterative
- ◉ Successive displacement
- ○ Gauss Jorden
- ○ Gauss elimination

correct 💯

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 8 of 10 (Start time: 05:48:27 PM, 18 July 2023) Total Marks: 1

Consider the mesh point $w_l = w_{i,j}$ *of the solution domain*

where l *denotes the labeling to the* internal grid points *and* $l =$

Select the correct option

From Example 25

Reload Math Equations

- $i + (m + 1 + j)(n - 1)$
- $i + (n - 1 - j)(m - 1)$
- $i + (m - 1 - j)(n - 1)$ correct 💯
- $j + (m - 1 - i)(n - 1)$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 10 of 10 (Start time: 05:50:08 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the rotated five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Lecture No.29

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$ correct 💯
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 9 of 10 (Start time: 05:49:14 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

From Example No.25

Select the correct option

Reload Math Equations

- (●) $2(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$ correct 💯
- ( ) $2(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$
- ( ) $4(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$
- ( ) $4(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:24 PM, 18 July 2023

Question # 3 of 10 (Start time: 08:27:03 PM, 18 July 2023) Total Marks: 1

A finite difference method when applied on PDE will be stable if the amplification factor G is .....

Select the correct option

Reload Math Equations

- ( ) Bounded correct 💯
- ( ) Unbounded
- ( ) None of these
- ( ) Unrestrained

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:24 PM, 18 July 2023

Question # 4 of 10 (Start time: 08:28:07 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

Select the correct option

Reload Math Equations

- $4(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$
- $2(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$
- (●) $2(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$ correct 💯
- $4(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Star

Question # 7 of 10 (Start time: 08:28:48 PM, 18 July 2023)

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c < 0$

Select the correct option

- Central difference
- (●) Forward difference correct 💯
- Crank-Nicolson scheme
- Backward difference

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MTH646 - Partial Differential Equations (Quiz#1)

Question # 8 of 10 (Start time: 08:29:17 PM, 18 July 2023)

The Crank-Nicolson scheme when applied on heat diffusion equation is .....

Select the correct option

- ○ Conditionally stable
- ○ None of these
- ○ Neither stable nor bounded
- ◉ Unconditionally stable

correct 💯

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sec(s)

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:24 PM, 18 July 2023

Question # 9 of 10 (Start time: 08:30:06 PM, 18 July 2023) **Total Marks:** 1

Which of the following mathematical expression represents the rotated five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- ◉ $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

correct 💯

- ○ $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- ○ $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- ○ $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 3 of 10 (Start time: 08:34:20 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4\, f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4}\, f_{i,j}$
- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$ correct 💯

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MTH646 - Partial Differential Equations (Quiz#1)

Question # 4 of 10 (Start time: 08:34:59 PM, 18 July 2023)

Fourier analysis method is used to find the ..... of finite difference scheme.

Select the correct option

- Stability correct 💯
- Convergence
- Consistency
- None of these

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 5 of 10 (Start time: 08:36:07 PM, 18 July 2023) Total Marks: 1

A finite difference scheme will be stable if the amplification factor G satisfied the following condition,

Select the correct option

Reload Math Equations

- $|G| < 1$
- $|G| \leq 1$ correct 💯
- $|G| = 1$
- $|G| \geq 1$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 7 of 10 (Start time: 08:38:17 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Poisson PDE when central difference approximation is applied on both derivatives with uniform step size h=0.5 in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -\frac{1}{4} f_{i,j}$ correct 💯
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4 f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 10 of 10 (Start time: 08:40:09 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$
- (selected) $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$ correct 💯
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 11:34 AM, 19 July 2023

Question # 7 of 10 (Start time: 11:38:21 AM, 19 July 2023) Total Marks: 1

Which of the following PDE generates first order upwind scheme after applying appropriate difference approximations and $c > 0$

Select the correct option

Reload Math Equations

- $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial^2 f(x,t)}{\partial x^2} = 0$
- $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$ correct 💯
- $\frac{\partial f(x,t)}{\partial t} - c\frac{\partial f(x,t)}{\partial x} = 0$
- $\frac{\partial f(x,t)}{\partial t} = c\frac{\partial^2 f(x,t)}{\partial x^2}$

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MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 11:29 AM, 19 July 2023

Question # 9 of 10 (Start time: 11:35:56 AM, 19 July 2023)

Total Marks: 1

Which of the following equation represents 2D Poisson partial differential equation?

Select the correct option

Reload Math Equations

- $\nabla^2 u = f(x,y)$ correct 💯
- $\nabla u = f(x)$
- $\nabla^2 u = 0$
- $\nabla u = 0$

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MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 11:29 AM, 19 July 2023

Question # 6 of 10 (Start time: 11:34:04 AM, 19 July 2023)

Total Marks: 1

Laplace partial differential equation is a type of..... partial equation.

Select the correct option

Reload Math Equations

- Parabolic
- None of these
- Elliptical correct 💯
- Hyperbolic

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Question # 7 of 10 (Start time: 08:47:07 PM, 18 July 2023)

Gauss-Seidel method is also known as..... Method.

Select the correct option

- ○ Jacobi's iterative
- ◉ Successive displacement
- ○ Gauss Jorden

correct 100

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Question # 8 of 10 (Start time: 08:29:17 PM, 18 July 2023)

The Crank-Nicolson scheme when applied on heat diffusion equation is ....

Select the correct option

- ○ Conditionally stable
- ○ None of these
- ○ Neither stable nor bounded
- ◉ Unconditionally stable

correct 100

Maths with Fatima Ali

which of the following difference approximation will be used to make upwind scheme when $c < 0$

Select the correct option

- ○ Central difference
- ◉ Forward difference
- ○ Crank-Nicolson scheme
- ○ Backward difference

correct 100

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Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$
- (●) $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$ correct 💯
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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- $4w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$ correct 💯
- $w_{i,j} = 4[w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$
- $w_{i,j} = 4[(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$
- (●) $4w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i,j+1}]$

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Click to Save Answer & Move to Next Question

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MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 05:39 PM, 18 July 2023

Question # 4 of 10 (Start time: 05:43:24 PM, 18 July 2023)

Total Marks:

Question # 8 of 10 (Start time: 05:48:27 PM, 18 July 2023)

Total Marks: 1

Consider the mesh point $w_l = w_{i,j}$ *of the solution domain*

where l *denotes the labeling to the* internal grid points *and* $l =$

Select the correct option

From Example 25

Reload Math Equations

- $i + (m + 1 + j)(n - 1)$
- $i + (n - 1 - j)(m - 1)$
- (●) $i + (m - 1 - j)(n - 1)$ correct 💯
- $j + (m - 1 - i)(n - 1)$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 5 of 10 (Start time: 05:45:16 PM, 18 July 2023) Total Marks: 1

Which of the following discretized factor is utilized to check the stability of finite difference scheme in Fourier transform.

Select the correct option

Reload Math Equations

- $u_{i,j} = G^j e^{Ik\Delta y}$
- $u_{i,j} = G^j e^{Ikx}$ correct 100
- $u_{i,j} = G^j e^{I\Delta x}$
- $u_{i,j} = G^j e^{Ikx}$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 6 of 10 (Start time: 05:45:42 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$ correct 100
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 10 of 10 (Start time: 05:50:08 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the rotated five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y directions?

Lecture No.29

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$ correct 100
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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Question # 4 of 10 (Start time: 05:43:24 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$ correct 100
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4 f_{i,j}$
- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 10 of 10 (Start time: 05:50:08 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the rotated five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y directions?

Lecture No.29

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$ correct 100
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 3 of 10 (Start time: 05:41:50 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE for the uniform grid spacing in both direction is given by the equation,

Select the correct option

Reload Math Equations

- $4w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$ correct 100
- $w_{i,j} = 4[w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$
- $w_{i,j} = 4[(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$
- $4w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i,j+1}]$

Maths with Fatima Ali

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:24 PM, 18 July 2023

Question # 3 of 10 (Start time: 08:27:03 PM, 18 July 2023) Total Marks: 1

A finite difference method when applied on PDE will be stable if the amplification factor G is

Select the correct option

- Bounded
- Unbounded
- None of these
- Unrestrained

unstable

correct 💯

Maths with Fatima Ali

Question # 4 of 10 (Start time: 08:34:59 PM, 18 July 2023)

Fourier analysis method is used to find the ____ of finite difference scheme.

Select the correct option

- Stability
- Convergence
- Consistency
- None of these

correct 💯

Maths with Fatima Ali

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:24 PM, 18 July 2023

Question # 4 of 10 (Start time: 08:28:07 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

Select the correct option

- $4(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$
- $2(\frac{h^2}{k^2}-1)w_{i,j} = [w_{i-1,j-1}+w_{i+1,j+1}+w_{i+1,j-1}+w_{i-1,j+1}]$
- $2(\frac{h^2}{k^2}+1)w_{i,j} = [(w_{i-1,j}+w_{i+1,j})+(w_{i,j-1}+w_{i,j+1})]$
- k^2

actually for

I am also confus

correct 💯

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Question # 9 of 10 (Start time: 08:30:06 PM, 18 July 2023) Total Marks: 1

Which of the following mathematical expression represents the rotated five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$ correct 100
- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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Click to Save Answer & Move to Next Question

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 5 of 10 (Start time: 08:38:07 PM, 18 July 2023) Total Marks: 1

A finite difference scheme will be stable if the amplification factor G satisfied the following condition,

Select the correct option

Reload Math Equations

- $|G| < 1$
- $|G| \leq 1$ correct 100
- $|G| = 1$
- $|G| \geq 1$ unstable

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 05:39 PM, 18 July 2023

Question # 9 of 10 (Start time: 05:49:14 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

From Example No.25

Select the correct option

Reload Math Equations

- $2(\frac{h^2}{k^2} + 1)w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$ correct 100
- $2(\frac{h^2}{k^2} - 1)w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$
- $4(\frac{h^2}{k^2} - 1)w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$
- $4(\frac{h^2}{k^2} + 1)w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$

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MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:24 PM, 18 July 2023

Question # 3 of 10 (Start time: 08:27:03 PM, 18 July 2023) Total Marks: 1

A finite difference method when applied on PDE will be stable if the amplification factor G is ....

Select the correct option

Reload Math Equations

- Bounded
- Unbounded
- None of these
- Unrestrained

correct 💯

Maths with Fatima Ali

11 / 20

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 5 of 10 (Start time: 08:36:07 PM, 18 July 2023) Total Marks: 1

A finite difference scheme will be stable if the amplification factor G satisfied the following condition,

Select the correct option

Reload Math Equations

- $|G| < 1$
- $|G| \leq 1$
- $|G| = 1$
- $|G| \geq 1$

correct 💯

Maths with Fatima Ali

18 / 20

Question # 7 of 10 (Start time: 08:38:17 PM, 18 July 2023) Total Marks: 1

The discretized form of 2D Poisson PDE when central difference approximation is applied on both derivatives with uniform step size h=0.5 in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -\frac{1}{4} f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4 f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$

correct 💯

Maths with Fatima Ali

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Reload Math Equations

- $u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$
- $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$
- (●) $u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$ correct 💯
- $u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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Click to Save Answer & Move to Next Question

20 / 20

MTH646 - Partial Differential Equations (Quiz#1) Quiz Star

Question # 7 of 10 (Start time: 08:28:48 PM, 18 July 2023)

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c\frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c < 0$

Select the correct option

- Central difference
- (●) Forward difference correct 💯
- Crank-Nicolson scheme

Maths with Fatima Ali

MTH646 - Partial Differential Equations (Quiz#1) Quiz Start Time: 08:33 PM, 18 July 2023

Question # 3 of 10 (Start time: 08:34:20 PM, 18 July 2023) Total Marks:

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is .....

Select the correct option

Reload Math Equations

- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4\,f_{i,j}$
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4}f_{i,j}$
- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$
- (●) $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$ correct 💯

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Click to Save Answer & Move to Next Question