

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

- |                                  |                         |
|----------------------------------|-------------------------|
| <input type="radio"/>            | Jacobi's iterative      |
| <input checked="" type="radio"/> | Successive displacement |
| <input type="radio"/>            | Gauss Jordan            |
- correct 100
- Maths with Fatima Ali

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

- |                                  |                            |
|----------------------------------|----------------------------|
| <input type="radio"/>            | Conditionally stable       |
| <input type="radio"/>            | None of these              |
| <input type="radio"/>            | Neither stable nor bounded |
| <input checked="" type="radio"/> | 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

- |                                  |                       |
|----------------------------------|-----------------------|
| <input type="radio"/>            | Central difference    |
| <input checked="" type="radio"/> | Forward difference    |
| <input type="radio"/>            | Crank-Nicolson scheme |
| <input type="radio"/>            | Backward difference   |
- correct 100
- Maths with Fatima Ali
- $c < 0$

Which of the following mathematical expressions 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
- ☐  $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

Saving...



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

Click to Save Answer & Move to Next Question

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

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 100
- ☐  $j + (m - 1 - i)(n - 1)$

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

☐  $u_{i,j} = G^j e^{i\Delta x}$

☐  $u_{i,j} = G^i e^{ikx}$

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

☐  $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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 100

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

☐  $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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

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

☐  $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$

MTH645 - 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?

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 100

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

☐  $u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$

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

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

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

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

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

correct 100

unstable

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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 100

Maths with Fatima Ali

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

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

correct 100

actually for

I am also confused

Maths with Fatima Ali

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

Click to Save Answer &amp; 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: 08:36:07 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 100
- ☐  $|G| = 1$
- ☐  $|G| \geq 1$  unstable

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

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 **correct 100**
- ☐ Unbounded
- ☐ None of these
- ☐ Unrestrained

Reload Math Equations

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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

- ☐  $|G| < 1$
- ☒  $|G| \leq 1$  **correct 100**
- ☐  $|G| = 1$
- ☐  $|G| \geq 1$

Reload Math Equations

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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

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

Reload Math Equations

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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

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

Click to Save Answer & Move to Next Question

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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 100
- ☐ Crank-Nicolson scheme

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 100

Click to Save Answer & Move to Next Question