Unit 9 - Week 7: Stability Analysis

Assignment 7

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

Due on 2020-03-18, 23:59 IST.

1) The von Neumann stability analysis is applicable for *1 point*

- Nonlinear PDEs with periodic boundary conditions
- Nonlinear PDEs with non-periodic boundary conditions
- Linear PDEs with periodic boundary conditions
- Linear PDEs with non-periodic boundary conditions

No, the answer is incorrect.
Score: 0
Accepted Answers:
Linear PDEs with periodic boundary conditions

2) The range of γ for getting a converged solution using consistent Forward Time Central Space discretization for a problem governed by a one dimensional unsteady parabolic equation is *0 points*

- $\gamma < 0$
- $0 < \gamma < 0.5$
- $0 < \gamma < 1$
- $\gamma > 1$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$0 < \gamma < 1$

3) Comment on the stability of the implicit Forward Time Central Space scheme applied to linear convective equation *1 point*

- Always unstable
- Unconditionally stable
- Conditionally stable
- Cannot be determined

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

4) Even order derivatives in the leading truncation error results in *1 point*

- Dissipation error
- Dispersion error
- Both Dispersion and Dissipation error
- None of the above

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

5) Numerical dissipation causes *1 point*

- smearing of sharp gradients
- oscillations
- undershoots and overshoots
- inaccuracy

No, the answer is incorrect.
Score: 0
Accepted Answers:
smearing of sharp gradients

6) Which is correct regarding the upwind scheme? *1 point*

- Only numerical dispersion error arises
- Only numerical diffusion error arises
- Both numerical dispersion and numerical diffusion error arise
- Neither numerical dispersion nor numerical diffusion error arise

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both numerical dispersion and numerical diffusion error arise

7) Stability is the property of a *1 point*

- Partial differential equation
- Discretized equation
- Modified partial differential equation
- None of the above

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

8) The von Neumann stability analysis can be used to predict the stability criteria of nonlinear partial differential equations. *1 point*

- True
- False

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