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
   - 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 $\gamma$ for getting a converged solution using consistent Forward Time Central Space discretization for a problem governed by a one dimensional unsteady parabolic equation is

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

   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

   - 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

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

   No, the answer is incorrect. Score: 0
   Accepted Answers:
   - None of the above

5) Numerical dispersion causes

   - smeared out sharp gradients
   - oscillations
   - undershoots and overshoots
   - instability

   No, the answer is incorrect. Score: 0
   Accepted Answers:
   - Undershoots and overshoots

6) Which is correct regarding the upwind scheme?

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

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

7) Stability is the property of a

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

   No, the answer is incorrect. Score: 0
   Accepted Answers:
   - Partial differential equation

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

   - True
   - False

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