Introduction to Week Six

Numerical Solutions of PDEs

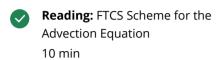
Direct Solution of Boundary Value Problems

Iterative Solution of Boundary Value Problems

Time-stepping Methods for Initial Value Problems

Video: Explicit Methods for Solving the Diffusion Equation | Lecture 69





Video: Von Neumann Stability
Analysis of the FTCS Scheme |
Lecture 70
14 min

Reading: Von Neumann Stability
Analysis of the FTCS Scheme for the
Advection Equation
10 min

Video: Implicit Methods for Solving the Diffusion Equation | Lecture 71 8 min

Reading: Implicit Discrete Advection
Equation
10 min

Video: Crank-Nicolson Method for the Diffusion Equation | Lecture 72 13 min

Reading: Lax Scheme for the Advection Equation
10 min

Diffusion Equation | Lecture 73
11 min

Reading: Difference Approximation
for the Desiration of Regulators

Video: MATLAB Solution of the

Reading: Difference Approximations for the Derivative at Boundary Points
1 min

Ungraded External Tool: The
Diffusion Equation with No-Flux
Boundary Conditions
30 min

Quiz

Programming Assignment: Twodimensional Diffusion Equation

Farewell

FTCS Scheme for the Advection Equation

Consider the one-dimensional advection equation given by

$$\frac{\partial u}{\partial t} = -c \frac{\partial u}{\partial x}$$

Using the second-order central difference approximation for the spatial derivative and the first-order Euler method for the time integration, derive the FTCS scheme for the advection equation.

✓ Completed		Go to next item				
△ Like	□ Dislike	e P Report an issue				