


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
13 min


 **Reading:** Using a Second-Order Time-Stepping Method
10 min


 **Reading:** FTCS Scheme for the Advection Equation
10 min


 **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

 **Video:** MATLAB Solution of the Diffusion Equation | Lecture 73
11 min

 **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: Two-dimensional Diffusion Equation

Farewell

Using a Second-Order Time-Stepping Method

Use the second-order Runge-Kutta method known as the modified Euler method to write a two-step process for solving the one-dimensional diffusion equation.

 **Completed** [Go to next item](#)

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