

MP468C — Computational Physics 2 — Lab 10

1. Use the Crank-Nicolson method to solve the diffusion equation

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}, \quad t > 0, \quad x \in (-5, 5)$$

with zero Dirichlet boundary conditions. The starting distribution is

$$u(x, 0) = \begin{cases} 1 & x \in (-2, 2) \\ 0 & \text{elsewhere} \end{cases}$$

Plot the solution as a contour plot in x and t .