

Homework 5

Solve the wave equation

$$\frac{\partial^2 u}{\partial t^2} = \nabla^2 u + 5(e^{-5\pi t} - 1) \sin(4\pi x) \sin(2\pi y) + y$$

inside a rectangle $0 \leq x \leq 1$, $0 \leq y \leq 2$. The boundary conditions are

$$\begin{aligned}u(0, y, t) &= 0, \\u(1, y, t) &= 0, \\u(x, 0, t) &= 0, \\u(x, 2, t) &= x(1 - x),\end{aligned}$$

and the initial conditions are

$$\begin{aligned}u(x, y, 0) &= f(x, y), \\ \frac{\partial u}{\partial t}(x, y, 0) &= 0.\end{aligned}$$

To be handed in before 5 p.m., March 12.