AMATH 569 Homework Assignment #3 Spring 2023

Assigned: April 26,2023
Due: May 3, 2023

1. (a) Solve using Fourier transform in x and Laplace transform in t:

PDE: $\frac{\partial}{\partial t}u - D\frac{\partial^2}{\partial x^2}u = \delta(x-\xi)\delta(t-\tau), \quad -\infty < x < \infty,\ t > 0, -\infty < \xi < \infty, \tau > 0$

BC: $u(x,t) \to 0$ as $x \to \pm\infty,\ t > 0$

IC: $u(x,0) = 0,\ -\infty < x < \infty.$

(b) Same problem as in (a), except that you do not use Laplace transform in t. You need to figure out the matching condition for your ODE across t=τ.