M597K: Homework Assignment 12

Date: Nov. 25, Monday; Due Wed. Dec. 4.

1. Use separation of variables to derive a solution formula for

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0, \quad 0 < x < L, \ 0 < y < H$$

$$u(0, y) = 0,$$
$$u(L, y) = 0,$$
$$u(x, 0) = 0,$$
$$u(x, H) = g(x).$$

(1)

2. By guessing or eigenfunction expansion, find a solution to

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 5 \sin \frac{3\pi x}{L} \sin \frac{2\pi y}{H}, \quad 0 < x < L, \ 0 < y < H$$

$$u(0, y) = 0,$$
$$u(L, y) = 0,$$
$$u(x, 0) = 0,$$
$$u(x, H) = 0.$$

(2)

End.