

92.445/545 Partial Differential Equations Spring 2013

Homework Assignment # 5

Due April 8

PLEASE SHOW ALL WORK! You will not receive full credit if you do not show your work. You may work together, but everyone must turn in his/her own homework set.

1. Solve the following IBVP for the nonhomogeneous wave equation.

$$\begin{aligned}u_{tt} - 4u_{xx} &= 6 \sin(t) \sin(x) && \text{on } 0 < x < \pi, t > 0 \\u(0, t) &= 0 && t \geq 0 \\u(\pi, t) &= 0 && t \geq 0 \\u(x, 0) &= 0 && 0 \leq x \leq \pi \\u_t(x, 0) &= 0 && 0 \leq x \leq \pi\end{aligned}$$

2. Solve the following IBVP for the heat equation with nonzero boundary conditions.

$$\begin{aligned}u_t &= u_{xx} && \text{on } 0 < x < \pi, t > 0 \\u(0, t) &= 2 && t \geq 0 \\u(\pi, t) &= 2 && t \geq 0 \\u(x, 0) &= 2 + \sin(2x) && 0 \leq x \leq \pi\end{aligned}$$