

92.445/545 Partial Differential Equations Spring 2013

Homework Assignment # 8

Due April 29

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. Use the Maximum Principle to find the maximum and minimum values of the solution u of the following BVP:

$$\begin{aligned}\Delta u &= 0 && \text{on } \{(x, y) | x^2 + y^2 < 4\} \\ u(x, y) &= e^x && \text{on } \{(x, y) | x^2 + y^2 = 4\}\end{aligned}$$

2. Use the Mean Value Property to find $u(0, 0)$, where u is the solution of the following BVP:

$$\begin{aligned}\Delta u &= 0 && \text{on } \{(x, y) | x^2 + y^2 < 1\} \\ u(x, y) &= 1 - x^2 && \text{on } \{(x, y) | x^2 + y^2 = 1\}\end{aligned}$$