

Math 309 Quiz 9

December 13, 2015

Problem 1. Find a solution to Laplace's equation $u_{xx} + u_{yy} = 0$ in the rectangle bounded by the lines $x = 0, x = 2, y = 0$, and $y = 1$, and satisfying the boundary conditions

$$u(0, y) = 0, \quad u(2, y) = 1 - |2y - 1|, \quad 0 \leq y \leq 1$$

$$u(x, 0) = 0, \quad u(x, 1) = 0, \quad 0 \leq x \leq 2.$$

Problem 2. Find a solution to Laplace's equation $u_{xx} + u_{yy} = 0$ in the rectangle bounded by the lines $x = 0, x = 2, y = 0$, and $y = 3$, and satisfying the boundary conditions

$$u(0, y) = 0, \quad u(2, y) = 0, \quad 0 \leq y \leq 1$$

$$u(x, 0) = \sin(\pi x), \quad u(x, 3) = \sin(\pi x/2), \quad 0 \leq x \leq 2.$$