

Class Problems and Homework
Physics 403: Mathematical Methods
March 31, 2008

Problems: Instructor, group and homework

Solve each problem by separation of variables.

1. Solve

$$3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$$

subject to $u(x, 0) = 4e^{-x}$.

2. Solve

$$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial y} + u$$

subject to $u(x, 0) = 3e^{-5x} + 2e^{-3x}$.

3. Solve

$$\frac{\partial u}{\partial t} = 4\frac{\partial^2 u}{\partial x^2}$$

subject to $u(0, t) = 0$, $u(\pi, t) = 0$, and $u(x, 0) = 2 \sin 3x - 4 \sin 5x$.