Math 453 – Homework 10

Peyam Tabrizian

Friday, May 5, 2017

This assignment is due on **Friday, May 5, at 11:50 AM**

Reading: Section 3.2

Note: Again, we will have started with 4.1 (Separation of Variables) already, but you won't be responsible for it until HW 11.

Chapter 3: 4, 5, and the following Addditional Problem:

Additional Problem: Solve using characteristics:

$$\begin{cases} (u_{x_1})^2 + (u_{x_2})^2 = 1 & \text{in } W \\ u(x_1, 0) = 1 & \text{on } \partial W \end{cases}$$

where $u = u(x_1, x_2)$ and $W = \{(x_1, x_2) \in \mathbb{R}^2 \mid x_2 > 0\}$.

Note: In this case, there are *two* possible choices for $p_2(0)$, so you'll need to proceed in cases and ultimately obtain *two* solutions of the PDE. Note that this is consistent with the remark at the bottom of page 103 that says that a vector p^0 satisfying the compability conditions may not exist or may not be unique.