

Homework #6, due 05/26, in class

Each problem is worth 5 points.

Problem 1. Solve the IVP for $u(x, y)$ using the method of characteristics:

$$\begin{aligned}u_x + u_y + 2u &= 0, & -\infty < x < \infty, & 0 < y < \infty \\u(x, 0) &= \cos x, & -\infty < x < \infty\end{aligned}$$

Problem 2. Solve the IVP for $u(x, y)$ using the method of characteristics:

$$\begin{aligned}xu_x + u_y + yu &= 0, & -\infty < x < \infty, & 0 < y < \infty \\u(x, 0) &= \sin x, & -\infty < x < \infty\end{aligned}$$

Problem 3. Solve the IVP for $u(x, y)$ using the method of characteristics:

$$\begin{aligned}xu_x + yu_y + 2u &= 0, & -\infty < x < \infty, & 1 < y < \infty \\u(x, 1) &= \sin x, & -\infty < x < \infty\end{aligned}$$

From the text book:

Problem 6.2 (a)

Problem 6.2 (b)

Problem 6.2 (d)

Problem 7. Find the general solution to the second order PDE

$$2u_{xx} - 3u_{xy} + u_{yy} = 0$$

Problem 8. Find the general solution to the second order PDE

$$4u_{xx} - u_{yy} = 0$$

Problem 9. Find the general solution to the second order PDE

$$u_{xx} + u_{xy} - 2u_{yy} = 1$$