Math 568 - 172

HW # 5

Problem #1 Solve

$$\begin{cases} u_{tt} - \Delta u = 0, & \text{in } \mathbb{R}^3,\ t > 0 \\ u(x,0) = x_1 x_3, \quad u_t(x,0) = x_2 \end{cases}$$

where $x = (x_1, x_2, x_3) \in \mathbb{R}^3$.

Problem #2 Solve

$$\begin{cases} u_{tt} - \Delta u = 0, & \text{in } \mathbb{R}^2,\ t > 0 \\ u(x_1, x_2, 0) = x_1^2 + x_2^2 \\ u_t(x_1, x_2, 0) = x_3 \end{cases}$$

Problem #3 Solve

$$\begin{cases} u_{tt}(x,t) - 4 u_{xx}(x,t) = xt, & x \in \mathbb{R},\ t > 0 \\ u(x,0) = 1, \quad u_t(x,0) = 2x \end{cases}$$
