

QUIZ 3 (385) FALL 2004

Problem 1. Find a solution to the following initial value problem:

$$u_{tt} = c^2 u_{xx} \quad -\infty < x < \infty$$

$$u(x, 0) = f(x), \quad u_t(x, 0) = g(x)$$

where $f(x) = 1$ for $|x| \leq 1$ and $f(x) = 0$ for $|x| > 1$; $g(x) = 1 - |x|$ for $|x| \leq 1$ and $g(x) = 0$ for $|x| > 1$;

Problem 2. Solve the initial value problem

$$u_{tt} = c^2 u_{xx} - u_t \quad 0 < x < \pi$$

$$u(0, t) = 0, \quad u(\pi, t) = 0$$

$$u(x, 0) = \sin(x)$$

$$u_t(x, 0) = 0.$$

Problem 3. Solve the initial value problem

$$u_{tt} = c^2 u_{xx} \quad x > 0$$

$$u_x(0, t) = h(t), \quad u(x, 0) = u_t(x, 0) = 0.$$

Problem 4. Solve the initial value problem

$$u_{tt} = c^2 u_{xx} - u_x \quad 0 < x < \pi$$

$$u(0, t) = 0, \quad u(\pi, t) = 0$$

$$u(x, 0) = \sin(x)$$

$$u_t(x, 0) = 0.$$

Typeset by $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\mathcal{T}\mathcal{E}\mathcal{X}$