

EXTRA CREDIT HOMEWORK 2, COURSE 385, FALL 2004

Problem 1. Find a solution $u(x, t)$ to the boundary value problem

$$\begin{aligned}u_{tt} &= c^2 u_{xx} + q(x) \quad 0 < x < 1, \\u(0, t) &= u(1, t) = 0 \\u(x, 0) &= f(x), \quad u_t(x, 0) = g(x).\end{aligned}$$

Problem 2. (four points) Solve the initial value problem

$$\begin{aligned}u_{tt} &= c^2 u_{xx} + A(x) \sin(\omega t) \quad 0 < x < 1, \\u(0, t) &= u(1, t) = 0 \\u(x, 0) &= 0, \quad u_t(x, 0) = 0.\end{aligned}$$

Express your solution in terms of the coefficients of the Fourier sine series of A on $(0, 1)$.