

Supplementary problems: 13.4 # 1, 3, 6, 12;

Quiz: 13.4

Compulsory problems:

Consider the wave equation

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2} \quad (1)$$

with the clamped boundary condition $u(0, t) = u(\pi, t) = 0$

- (1) [5 pts.] Which **one** and only one of the following initial conditions will yield a physically relevant solution (just like in HW6)? You need this to solve # 2, so you better not get this wrong.

- (i) $u(x, 0) = \cos x; \quad \partial_t u(x, 0) = 0$
- (ii) $u(x, 0) = \sin 2x; \quad \partial_t u(x, 0) = 0$
- (iii) $u(x, 0) = \sin(x/2); \quad \partial_t u(x, 0) = 0$

- (2) [40 pts.] For the one initial condition from above that yields a physically relevant solution, solve the wave equation.

- (3) [15 pts.] A node x_* of a wave is defined as the points where the amplitude is minimum and the point on the wave does not move; i.e., $u(x_*, t) = \partial_t u(x_*, t) = 0$. Find these location of these points (x_*).

Your homework raw score is: $\frac{n}{2m} \cdot M + \left(1 - \frac{n}{2m}\right) \cdot N = N + \frac{n}{2m}(M - N)$. For this homework, $M = 60$, $m = 4$, N is the number of compulsory problems you get correct, and n is the number of supplementary problems you complete. It should be noted that for the supplementary problems I will be looking for **full completion**, but I won't take off points for mistakes.