homework 6

1. 求弦振动方程

$$u_{tt} - a^2 u_{xx} = 0, \quad 0 < x < l, \quad t > 0$$

满足以下定解条件的解:

$$\begin{cases} u|_{x=0} = u_x|_{x=l} = 0 \\ u|_{t=0} = \sin \frac{3}{2l} \pi x, \ u_t|_{t=0} = \sin \frac{5}{2l} \pi x \end{cases}$$

2. 求解

$$\begin{cases} u_{tt} = a^2 u_{xx}, 0 \leqslant x \leqslant l \\ u_x(t, 0) = 0, u_x(t, l) = 0 \\ u(0, x) = 0, u_t(0, x) = Ae^{-\alpha x} \end{cases}$$