$$\begin{cases} \dfrac{\delta^2 u}{\delta x^2} - \dfrac{1}{V^2}\dfrac{\delta^2 u}{\delta t^2} = 0 & 0 \le t \le T,\ 0 \le x \le l \\ u(x,0) = u_0(x) \\ u(0,t) = 0 \\ u(l,t) = 0 \\ \dfrac{\delta u(x,t)}{\delta t} = 0 \end{cases}$$

$x_i = i h_x \quad i = \overline{0, I} \quad h_x = \dfrac{l}{I}$

$t_k = k h_t \quad k = \overline{0, K} \quad h_t = \dfrac{T}{K}$

$$\frac{\delta^2 u(x_i, t_k)}{\delta x^2} \approx \frac{u(x_{i+1}, t_k) - 2u(x_i, t_k) + u(x_{i-1}, t_k)}{h_x^2}$$

$$\frac{\delta^2 u(x_i, t_k)}{\delta t^2} \approx \frac{u(x_i, t_{k+1}) - 2u(x_i, t_k) + u(x_i, t_{k-1})}{h_t^2}$$

$$\frac{\delta u(x_i, t_k)}{\delta t} \approx \frac{u(x_i, t_{k+1}) - u(x_i, t_k)}{h_t} \approx \frac{u(x_i, t_k) - u(x_i, t_{k-1})}{h_t}$$

$$\begin{cases} \dfrac{u_{i+1}^k - 2u_i^k + u_{i-1}^k}{h_x^2} - \dfrac{1}{V^2}\dfrac{u_i^{k+1} - 2u_i^k + u_i^{k-1}}{h_t^2} = 0 & i = \overline{1, I-1},\ k = \overline{1, K-1} \\ u_0^k = 0,\ u_l^k = 0, & k = \overline{0, K} \\ u_i^0 = \begin{cases} 1, & i = \left[\frac{3l}{4h_x}\right] \\ \frac{4}{3l} i h_x, & i < \left[\frac{3l}{4h_x}\right] \\ -\frac{4}{l} i h_x + 4, & i > \left[\frac{3l}{4h_x}\right] \end{cases} & i = \overline{0, I} \\ \dfrac{u_i^{k+1} - u_i^k}{h_t} = 0, \quad i = \overline{0, I},\ k = 0 \end{cases}$$

$$u_i^{k+1} = \frac{h_t^2 \cdot V^2}{h_x^2}\left(u_{i+1}^k + u_{i-1}^k\right) - u_i^{k-1} - 2\left(\frac{h_t^2 \cdot V^2}{h_x^2} - 1\right)u_i^k, \quad i = \overline{1, I-1}$$

$u_i^1 = u_i^0, \quad i = \overline{0, I}.$