

## Plucked string.

Suppose  $a = 1$ ,  $L = 1$  and we are looking for the solution of

$$u_{tt} = u_{xx}, \quad (1)$$

$$u(0, t) = u(L, t) = 0 \quad \text{for all } t, \quad (2)$$

$$u(x, 0) = f(x) \quad 0 < x < L \quad (3)$$

$$u_t(x, 0) = 0 \quad 0 < x < L, \quad (4)$$

where  $f(x)$  is the function  $cx$  for  $0 \leq x \leq 1/2$  and  $c(1-x)$  for  $1/2 \leq x \leq 1$ . Usually  $c$  is something small for a plucked string so let's suppose  $c = 0.05$ . Here are the plots for time  $t = 0$ ,  $t = 0.25$ ,  $t = 0.5$  and  $t = 1$ . We let  $F(x)$  be the odd extension of  $f(x)$ .

