

**Exercise 5**

Solve  $u_{tt} = c^2 u_{xx} + e^t \sin 5x$  for  $0 < x < \pi$ , with  $u(0, t) = u(\pi, t) = 0$  and the initial conditions  $u(x, 0) = 0$ ,  $u_t(x, 0) = \sin 3x$ .