

Exercise 12

Find the solution of the dissipative wave equation

$$u_{tt} - c^2 u_{xx} + \alpha u_t = 0, \quad -\infty < x < \infty, t > 0,$$
$$u(x, 0) = f(x), \quad \left(\frac{\partial u}{\partial t} \right)_{t=0} = g(x) \quad \text{for } -\infty < x < \infty,$$

where $\alpha > 0$ is the dissipation parameter.