Example. Suppose $u(x, t)$ solves the hyperbolic system

$$u_t + \begin{pmatrix} 1 & 1 \\ 4 & 1 \end{pmatrix} u_x = 0, \quad x > 0, \quad t > 0$$

with initial conditions and boundary conditions given by

$$u_1(x, 0) = f(x), \quad u_2(x, 0) = g(x), \quad u_1(0, t) = 0$$

Find the solution using the method of characteristics.