

Evans 03

(1) Suppose f is a function of a single variable and that the expression

$$u = f(x - at)$$

implicitly defines a function of x and t

Show that $u_t + au_x = 0$

$$u_t = \frac{\partial u}{\partial t} = f'(x - at)(-a)$$

$$u_x = \frac{\partial u}{\partial x} = f'(x - at)(1)$$

$$u_t + au_x =$$

$$\cancel{f'(x - at)(-a)} + a \cancel{f'(x - at)} = 0$$

