

Problem 24

In each of Problems 21 through 24, determine the order of the given partial differential equation; also state whether the equation is linear or nonlinear. Partial derivatives are denoted by subscripts.

$$u_t + uu_x = 1 + u_{xx}$$

Solution

The second derivative of u is the highest derivative, so the order of the PDE is 2. The PDE is nonlinear because there is a nonlinear function of u , namely uu_x .

$$uu_x = \frac{1}{2} \frac{\partial}{\partial x}(u^2)$$