

Deps. of DES

What is a differential equation
(DE or diff eq.)?

It's an equation that involves
derivative(s) of an unknown
function(s).

What is a partial diff. eq. (PDE)?

It's an eq. that involves
partial derivative(s) of an
unknown function(s).

PDE Ex: $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ p 182.

$$u(x, y) = ?$$

e.g., $u(x, y) = xy$ is a solution

Verify by substitution:

$$\frac{\partial u}{\partial x} = y \rightarrow \frac{\partial^2 u}{\partial x^2} = 0$$

$$\frac{\partial u}{\partial y} = x \rightarrow \frac{\partial^2 u}{\partial y^2} = 0$$

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0 + 0 = 0 \quad \checkmark$$