Notations for Derivatives

We will write

$$\frac{dy}{dx}, \quad y' \quad \text{and} \quad Dy$$

to all mean *the derivative of y with respect to x*. Only the first one specifies the independent variable x. In the other two you can only determine the independent variable from context.

When the independent variable is time t we will usually adopt the physicists' notation $\dot{x}$ for the derivative.

For second derivatives we have

$$\frac{d^2y}{dx^2} = y'' = D^2y$$

all mean the second derivative of y with respect to x. If $x = x(t)$ is a function of time we will also write $\ddot{x}$.

For higher derivatives we will use the notations

$$\frac{d^ny}{dx^n} = y^{(n)} = D^ny$$

to mean the n^{th} derivative.

18.03SC Differential Equations
Fall 2011