

Parametric Equations

$$x = f(t) \quad y = g(t)$$

parameter

The set of all points (x, y) is the graph and is static geometry.

The graph in addition to the Parametric Equations includes directionality and is called the Curve.

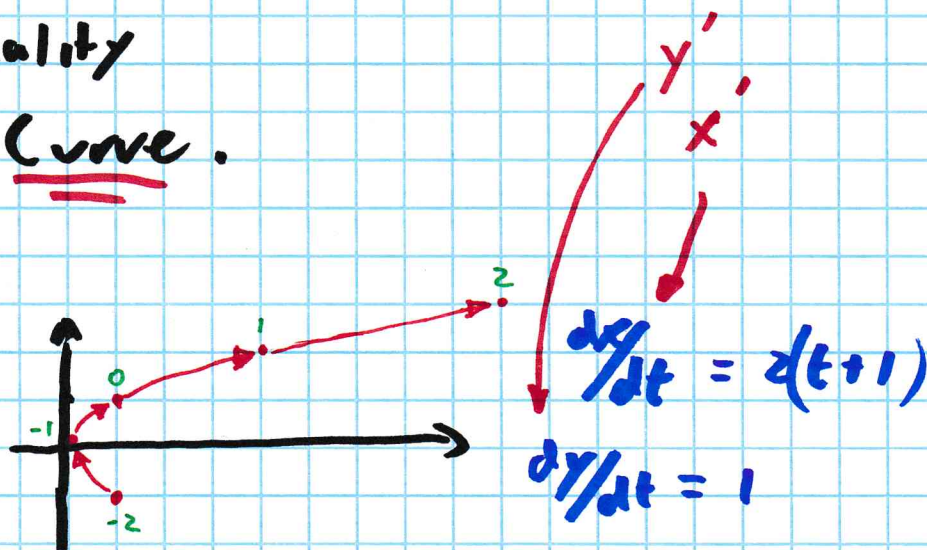
ex. 1

$$x = (t+1)^2$$

$$y = (t+1)$$

$$-2 \leq t \leq 2$$

t	-2	-1	0	1	2
x	1	0	1	4	9
y	-1	0	1	2	3



⚠ y' is not the tangent slope
 dy/dx is tangent slope

ex. 2

$$x = (1-t)^2$$

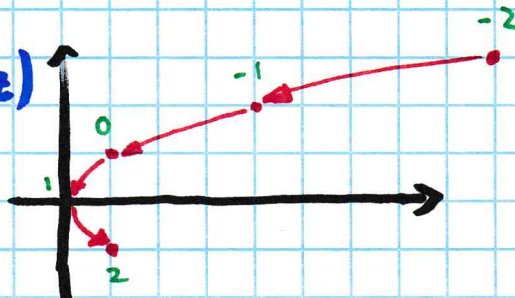
$$y = (1-t)$$

t	-2	-1	0	1	2
x	9	4	1	0	1
y	3	2	1	0	-1

$$-2 \leq t \leq 2$$

$$x' = -2(1-t)$$

$$y' = -1$$



When
 $x' > 0$
move $\rightarrow$
 $x' < 0$
move $\leftarrow$

Eliminating The Parameter

ex. 1

$$y = t + 1$$

Substitute

$$x = (t + 1)^2 \Rightarrow x = y^2$$

rectangular equation

Eliminating the parameter to obtain a rectangular equation discards 2 pieces of information

(1) Direction & velocity

(2) x-range & y-range

(x', y') or $(\frac{dx}{dt}, \frac{dy}{dt})$

ex.

$$x = t^4$$

$$x' = 4t^3$$

$$y = t^2$$

$$y' = 2t$$

$$-3 \leq t \leq 3$$

t	-3	-2	-1	0	1	2	3
x	81	16	1	0	1	16	81
y	9	4	1	0	1	4	9
x'	⊖	⊖	⊖	0	⊕	⊕	⊕
y'	⊖	⊖	⊖	0	⊕	⊕	⊕

