

1.5 Parametric Equations

Where you define both elements of (x, y) by another variable

Ex 1 Consider all pairs (x, y) where
 $x = t + 1$
 $y = t^2 + 2t$

Table

t	$x = t + 1$	$y = t^2 + 2t$	(x, y)
-3	-2	3	(-2, 3)
-2	-1	0	(-1, 0)
-1	0	-1	(0, -1)
0	1	0	(1, 0)
1	2	3	(2, 3)
2	3	8	(3, 8)
3	4	15	(4, 15)

2) Find the relationship "function"

- eliminate the parameter (t)

$$x = t + 1 \quad y = t^2 + 2t$$

Solve for t

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

$$y = x^2 - 2x + 1 + 2x - 2$$

$$y = x^2 - 1$$

Ex 2

$$x = t^2 + 2t \quad y = t + 1$$

Table $-3 \leq t \leq 3$

t	x	y	(x, y)
-3			(3, -2)
-2			(0, -1)
-1			(-1, 0)
0			(0, 1)
1			(3, 2)
2			(8, 3)
3			(15, 4)

$$t = \underline{y-1}$$

$$x = (y-1)^2 + 2(y-1)$$

$$\begin{array}{l} t_{\min} -4 \\ t_{\max} 2 \\ t_{\text{step}} 0.1 \end{array} \left. \vphantom{\begin{array}{l} t_{\min} \\ t_{\max} \\ t_{\text{step}} \end{array}} \right\} 6 \\ 0.01$$