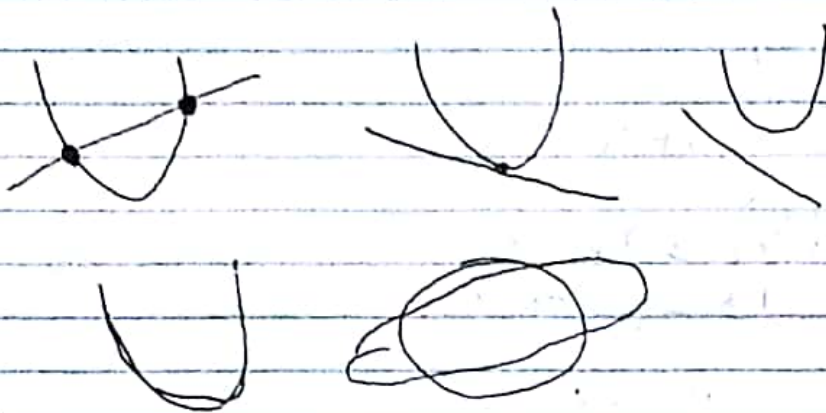


8.2 non-linear systems in two variables

8/30/17



Solve

$$x^2 = y - 1$$

$$y = 3x + 5$$

$$\text{Subst } x^2 = 3x + 5 - 1$$

$$\text{From } x^2 = 3x + 4$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x = 4$$

$$y = 3(4) + 5$$

$$y = 17$$

$$(4, 17)$$

$$x = -1$$

$$y = 3(-1) + 5$$

$$y = 2$$

$$(-1, 2)$$

Solve

$$x^2 + y^2 = 10$$

$$2x^2 - y^2 = 17$$

$$3x^2 = 27$$

$$x = 3$$

$$x = 3$$

$$3^2 + y^2 = 10$$

$$9 + y^2 = 10$$

$$y^2 = 1$$

$$y = \pm 1$$

$$(3, 1), (3, -1)$$

$$x^2 = 9$$

$$x = \pm 3$$

$$x = -3$$

$$(-3, 1)$$

$$(-3, -1)$$

$$4 + y^2 = 10$$

$$y^2 = 6$$

$$y = \pm \sqrt{6}$$



Solve

$$z = \frac{4}{w}$$

$$3z = 2w + 2$$

$$3\left(\frac{4}{w}\right) = 2w + 2$$

$$w\left(\frac{12}{w}\right) = (2w + 2)w$$

$$2w^2 + 2w - 12 = 0$$

$w + 3$	$w - 2$
$w = -3$	$w = 2$
$z = \frac{4}{-3}$	$z = \frac{4}{2}$
$z = -\frac{4}{3}$	$z = 2$
$(-3, -\frac{4}{3})$	$(2, 2)$

Solve

$$y = x^2$$

$$x - y = 0$$

\hookrightarrow

$$x = y$$

$$\frac{x}{x} = \frac{x^3}{x}$$

$$x^2 = 0$$

$$x = 0$$

$$y = 0$$

$$y = 0$$

$$y = 0$$

$$-2x(3x-5)$$

$$-6x^2 + 10x$$

$$(3x-5)(3x-5)$$

$$9x^2 - 15x - 15x + 25$$

Solve

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

$$3x - y = 5$$

$$-y = -3x + 5$$

$$y = 3x - 5$$

$$x^2 + (3x-5)^2 - 2x(3x-5) = 1$$

$$x^2 + 9x^2 - 30x + 25 - 6x^2 + 10x = 1$$

Simplify

$$4x^2 - 20x + 25 = 1$$

$\text{Let } y = 3x - 5$

$$y = 1$$

$$(2, 1)$$

$\text{Let } y = 3x - 5$

$$y = 4$$

$$(3, 4)$$

$$4x^2 - 20x + 25 = 0$$

$$(x-2)(x-3)$$

$$x^2 - 5x + 6 = 0$$

$$(x-2)(x-3)$$

Solve

$$z = \sqrt{x+2}$$

$$x+y=4$$

$$y=4-x$$

$$\sqrt{x+2} = 4-x$$

$$x+2 = x^2 - 8x + 16$$

$$x^2 - 9x + 14$$

$$(x-7)(x-2)$$

$$x=7$$

$$x=2$$

$$7+y=4$$

$$2+y=4$$

$$y=-3$$

$$y=2$$

$$(7, -3)$$

$$(2, 2)$$



Solve

$$3x - 6y = 9 \Rightarrow x - 2y = 3$$

$$y = x^2 + 3x - 5$$

$$\Rightarrow -x + 3$$

$$-2y = -x + 3$$

$$-2 = (2y+3)(2y+3)$$

$$y = (2y+3)^2 + 3(2y+3) - 5$$

$$4x^2 + 6y + 6y + 9$$

$$y = 4x^2 + 12y + 9 + 6y + 9 - 5$$

$$4x^2 + 12y + 9$$

$$4x^2 + 17y + 13$$

$$y = -\frac{13}{4}$$

$$y = -1$$

$$x = 2y + 3$$

$$x = -\frac{13}{4}$$

$$x = 2(-1) + 3$$

$$x = \frac{-13 + 6}{2}$$

$$\left(-\frac{7}{2}, -\frac{13}{4}\right)$$

$$x = 1 \quad (1, -1)$$

$$\text{Solve } (x = \frac{3}{2} + 7)2$$

$$2x = 3y + 14 \quad x = \frac{7}{2}$$

$$-10x + 15y = -20$$

$$2x - 3y = 14$$

$$-2x + 3y = 14$$

$0 = 0$ Infinite

$$\left(\frac{3}{2} + 7, y\right)$$