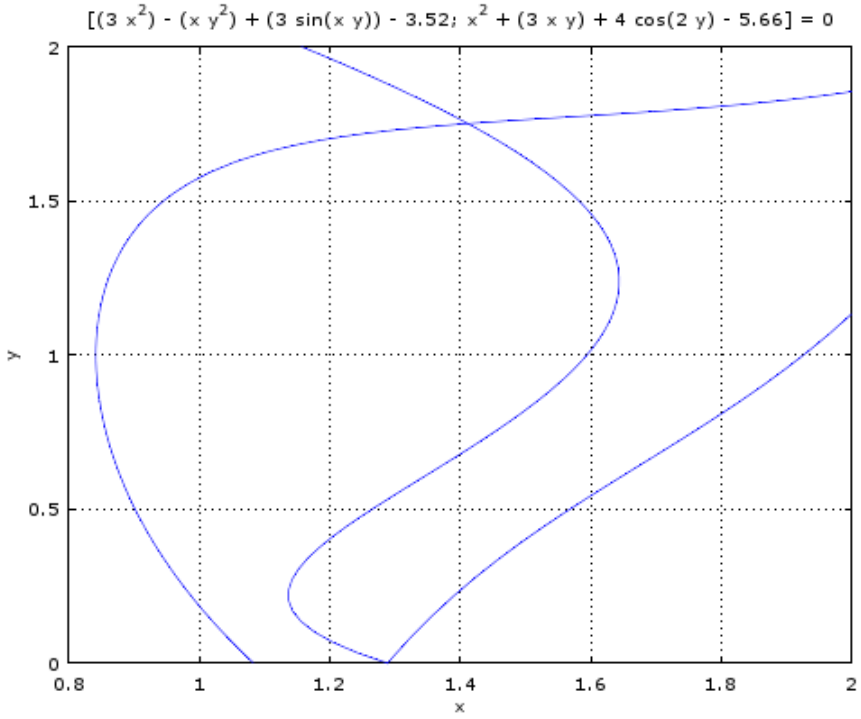
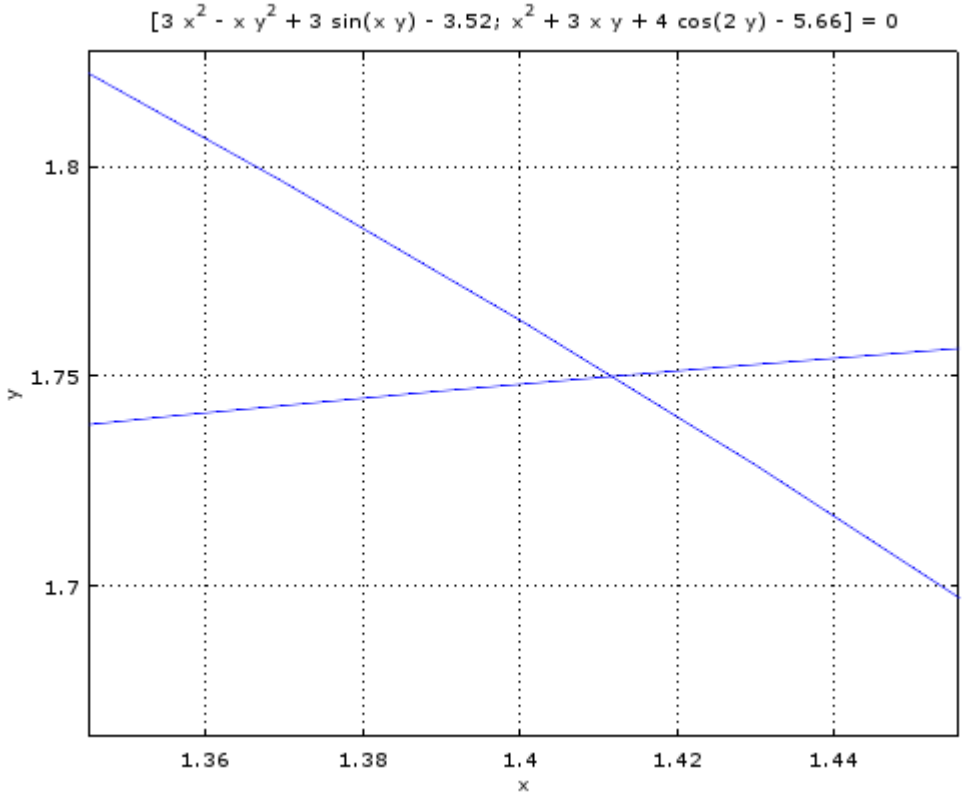
Giuseppe Ragusa. CI:28.224.758
Michael Wu. CI:25.847.074
Isabella Guzmán. CI:27.942.264

1.





Intervalo seleccionado: $X^{(0)}$ = [1.4 , 1.7]

Iteraciones	Jac	F0	dx	Error
1	1.8189 -7.8000 7.9001 6.2451	0.38422 -0.42719	0.012779 0.052239	0.052239
2	1.2732 -8.2838 8.0824 7.0789	-0.016190 0.023018	-0.0010013 -0.0021083	0.0021083
3	1.2949 -8.2596 8.0740 7.0443	-3.7105e-005 4.2274e-005	-1.1581e-006 -4.6739e-006	4.6739e-006
4	1.2950 -8.2595 8.0740 7.0442	-1.6395e-009 3.7981e-009	-2.6146e-010 -2.3950e-010	2.6146e-010
5	1.2950 -8.2595 8.0740 7.0442	-7.6383e-014 2.0428e-013	-1.5159e-014 -1.1625e-014	1.5159e-014

Este es el resultado final luego de las 5 iteraciones

```
ans =

   1.4118
   1.7501
```

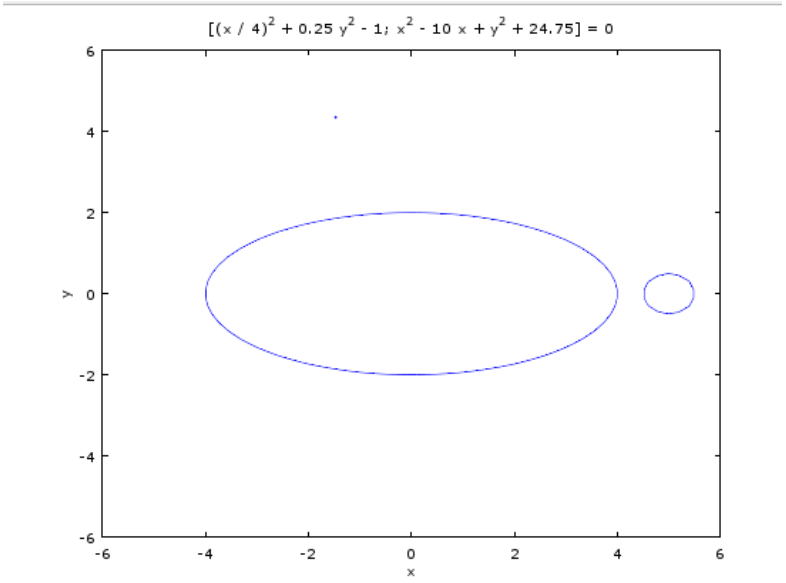
2.a)
Se define la función para a=4 y se gráfica en el intervalo [6,-6]

```
>> F= @(x,y)[(x/4).^2+0.25*y.^2-1;x.^2-10*x+y.^2+24.75]
F =

@(x, y) [(x / 4) .^ 2 + 0.25 * y .^ 2 - 1; x .^ 2 - 10 * x + y .^ 2 + 24.75]

>> ezplot(F,[-6,6])
```

Gráfica para a=4



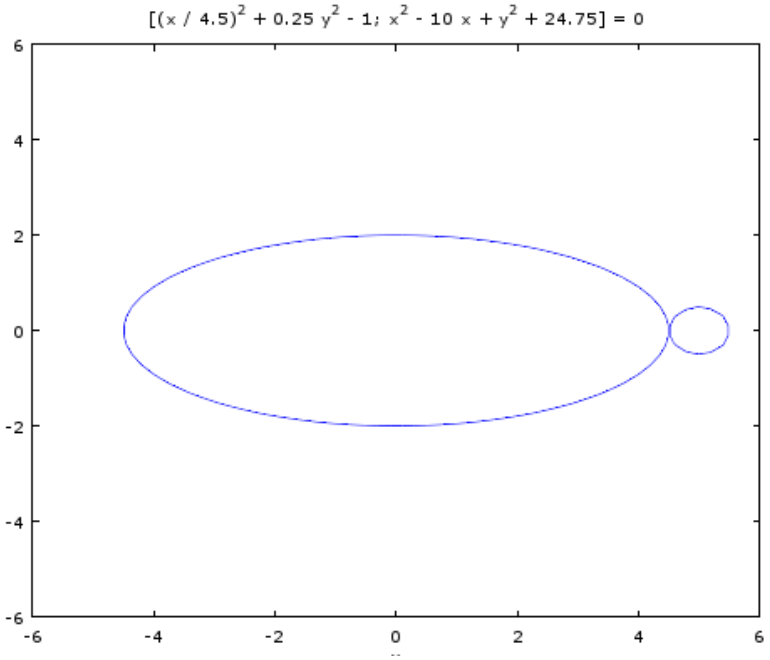
Se define la función para a=4.5 y se gráfica en el intervalo [6,-6]

```
>> F= @(x,y)[(x/4.5).^2+0.25*y.^2-1;x.^2-10*x+y.^2+24.75]
F =

@(x, y) [(x / 4.5) .^ 2 + 0.25 * y .^ 2 - 1; x .^ 2 - 10 * x + y .^ 2 + 24.75]

>> ezplot(F,[-6,6])
```

Gráfica para a=4.5



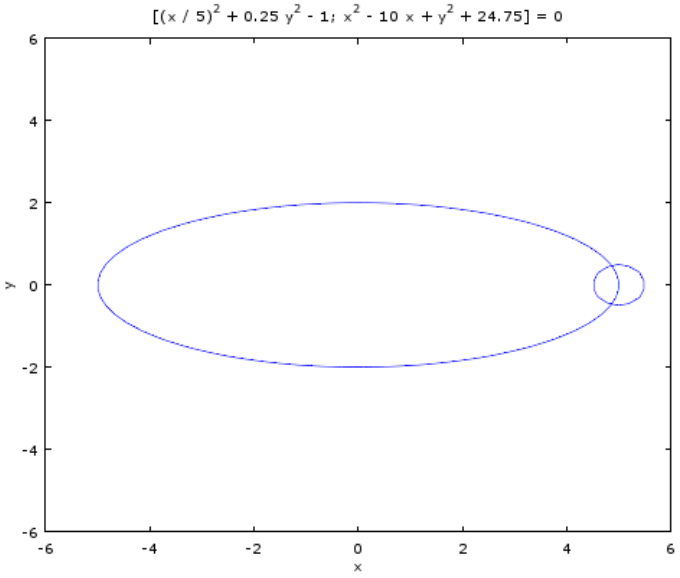
Se define la función para a=5 y se gráfica en el intervalo [6,-6]

```
>>  F= @(x,y)[(x/5).^2+0.25*y.^2-1;x.^2-10*x+y.^2+24.75]
F =

@(x, y) [(x / 5) .^ 2 + 0.25 * y .^ 2 - 1; x .^ 2 - 10 * x + y .^ 2 + 24.75]

>> ezplot(F,[-6,6])
```

Gráfica para a=5



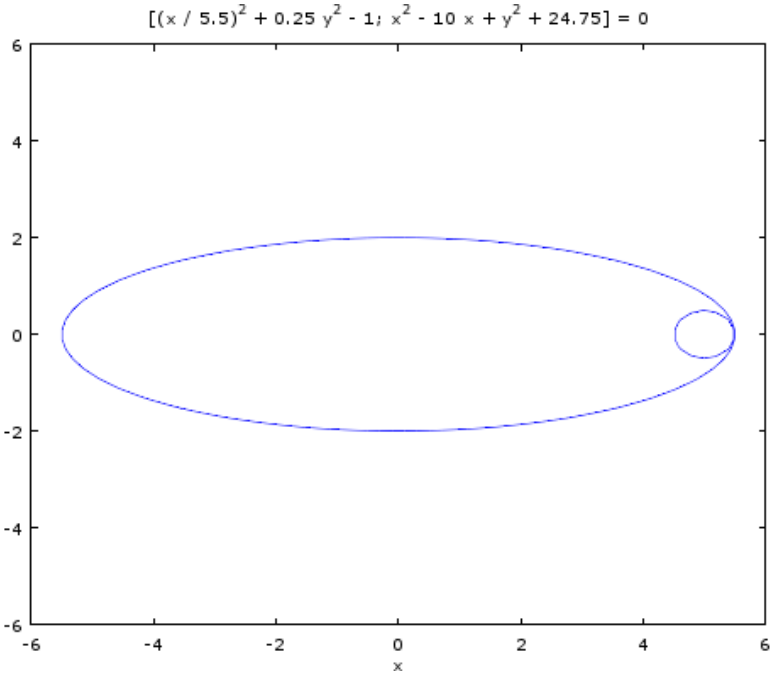
Se define la función para a=5.5 y se gráfica en el intervalo [6,-6]

```
>>  F= @(x,y)[(x/5.5).^2+0.25*y.^2-1;x.^2-10*x+y.^2+24.75]
F =

@(x, y) [(x / 5.5) .^ 2 + 0.25 * y .^ 2 - 1; x .^ 2 - 10 * x + y .^ 2 + 24.75]

>>  ezplot(F,[-6,6])
```

Gráfica para a=5.5

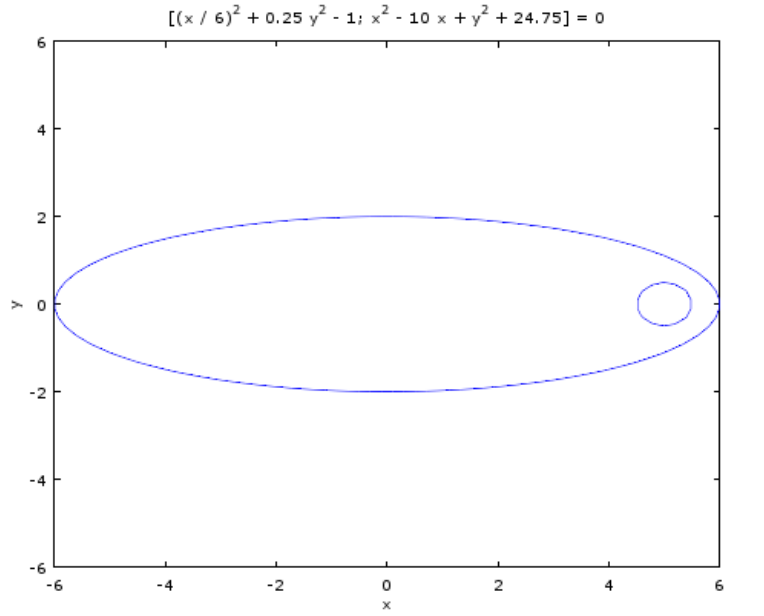


Se define la función para a=6 y se gráfica en el intervalo [6,-6]

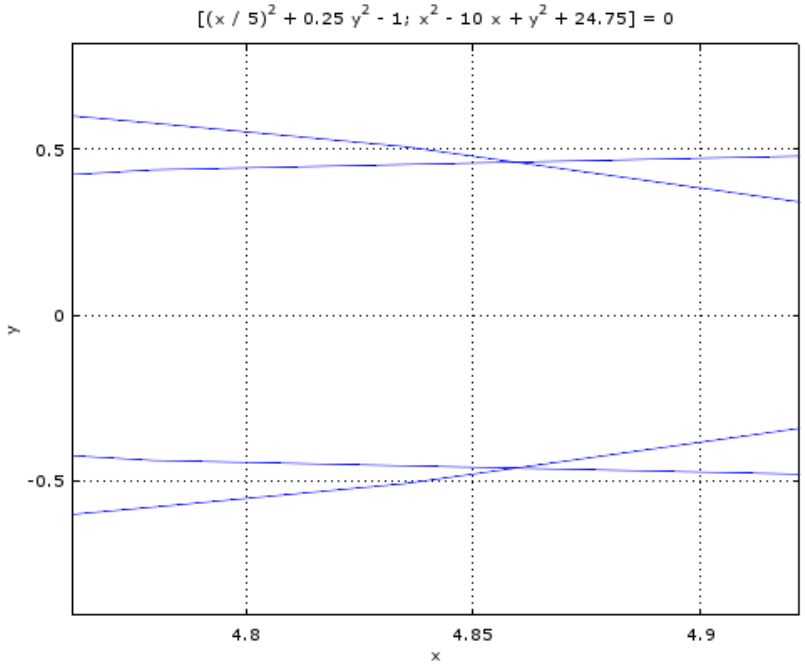
```
>> F= @(x,y)[(x/6).^2+0.25*y.^2-1;x.^2-10*x+y.^2+24.75]
F =

@(x, y) [(x / 6) .^ 2 + 0.25 * y .^ 2 - 1; x .^ 2 - 10 * x + y .^ 2 + 24.75]
```

Gráfica para a=6



Se tomó la gráfica para la cual a=5 ya que es la única que da 2 soluciones
Raíz 1 (4.86,0.49)
Raíz 2 (4.86,-0.49)



2. b)

Iteraciones de la primera raíz (4.86,0.49)

```
raiz =

   4.85482
   0.47846

niter =  4
```

Iteración 1

```
jac =

   0.38880   0.24502
  -0.27990   0.98010

f0 =

   0.0048090
   0.0097000

dx =

  -0.0051964
  -0.0113810

x =

   4.85480
   0.47862

error =  0.011381
```

Iteración 2

```
jac =

   0.38839   0.23933
  -0.29029   0.95734

f0 =

  3.3767e-005
  1.5819e-004

dx =

  1.2538e-005
  -1.6143e-004

x =

   4.85482
   0.47846

error =   1.6143e-004
```

Iteración 3

```
jac =

   0.38839   0.23925
  -0.29027   0.95702

f0 =

  1.0507e-008
  4.1108e-008

dx =

  -4.9959e-010
  -4.3105e-008

x =

   4.85482
   0.47846

error =   4.3105e-008
```

Iteración 4

```
jac =

   0.38839   0.23925
  -0.29027   0.95702

f0 =

  1.0800e-012
  4.3663e-012

dx =

  2.5049e-014
  -4.5548e-012

x =

   4.85482
   0.47846

error =   4.5548e-012
```

Iteraciones de la segunda raíz (4.86,-0.49)

```
raiz =

   4.85482
  -0.47846

niter =  3
```

Iteración 1

```
jac =

   0.38880  -0.24498
  -0.27990  -0.97990

f0 =

   0.0048090
   0.0097000

dx =

  -0.0051964
   0.0113833

x =

   4.85480
  -0.47862

error =  0.011383
```

Iteración 2

```
jac =

   0.38839  -0.23928
  -0.29029  -0.95713

f0 =

  3.3211e-005
  1.5596e-004

dx =

  1.2538e-005
  1.5915e-004

x =

   4.85482
  -0.47846

error =   1.5915e-004
```

Iteración 3

```
jac =

   0.38839  -0.23920
  -0.29027  -0.95682

f0 =

  2.3093e-009
  8.3160e-009

dx =

  -4.9959e-010
  8.8429e-009

x =

   4.85482
  -0.47846

error =   8.8429e-009
```

3)
$X^{(0)} = (1,1,1)^T$

Iteración #1:

```
>> g
g =

@(x, y, z) [(x .^ 2) - (2 * exp(y)) - (5 * z); (x .* y) + (z .^ 2) + sin(y .^ 2) - 1; (2 * x) + (y .^ 2) - z
 - 3]

>> newtonRaphson3x3(g,[1;1;1],(10^-10))
jac =

   2.000099999985849  -5.436835494165848  -5.000000000006111
   0.999999999997669   2.080490323730366   2.000099999994731
   1.999999999999780   2.000099999999172  -0.999999999999890

f0 =

  -9.43656365691809
   1.84147098480790
  -1.00000000000000

dx =

   1.030964098861995
  -0.821655612538239
  -0.581465192913353

x =

   2.030964098861995
   0.178344387461761
   0.418534807086647

error =  1.03096409886200
```

Iteración #2:

```
jac =

   4.062028197733270  -2.390593277588060  -5.000000000001670
   0.178344387461449   2.387572210712507   0.837169614172906
   2.000000000004221   0.356788774924510  -1.000000000002110

f0 =

  -0.358332614481580
  -0.430816209248950
   0.675200111176454

dx =

  -1.152529057834209
   0.744837514433040
  -1.364108340201569

x =

   0.878435041027786
   0.923181901894801
  -0.945573533114922

error =  1.36410834020157
```

Iteración #3:

```
jac =

   4.062028197733270  -2.390593277588060  -5.000000000001670
   0.178344387461449   2.387572210712507   0.837169614172906
   2.000000000004221   0.356788774924510  -1.000000000002110

f0 =

  -0.358332614481580
  -0.430816209248950
   0.675200111176454

dx =

  -1.152529057834209
   0.744837514433040
  -1.364108340201569

x =

   0.878435041027786
   0.923181901894801
  -0.945573533114922

error =  1.36410834020157
```

Iteración #4:

```
jac =

   2.376174513467610  -3.581171357884827  -5.000000000001670
   0.582492760861086   2.286677032625750  -0.801361659628075
   2.000000000004221   1.165085521721565  -1.000000000002110

f0 =

  -0.165905629846542
   0.185433322809900
   0.116103159734301

dx =

  -0.00707226307358878
  -0.07361892768221953
   0.01618628681983812

x =

   1.180964993658859
   0.508873833178063
  -0.384544542994932

error =  0.0736189276822195
```

Iteración #5:

```
jac =

   2.362029987317271  -3.327000056949636  -4.999999999997229
   0.508873833178214   2.164863049538557  -0.768989085990768
   1.999999999999780   1.017847666355820  -0.999999999997669

f0 =

  -0.00943267850002316
   0.00490488174265069
   0.00542710840598559

dx =

  -0.00230962129361424
  -0.00224891471396646
  -0.00148118677468987

x =

   1.178655372365245
   0.506624918464096
  -0.386025729769622

error =   0.00230962129361424
```

Iteración #6:

```
jac =

   2.357410744731059  -3.319526324609967  -4.999999999999449
   0.506624918465981   2.158795845437211  -0.771951459538345
   1.999999999999780   1.013349836926913  -1.000000000002110

f0 =

  -3.21541098080580e-006
   1.19468668624556e-005
   5.28250886455695e-006

dx =

   1.31159264735086e-006
  -4.72819180979423e-006
   3.11438175983766e-006

x =

   1.178656683957892
   0.506620190272287
  -0.386022615387862

error =   4.72819180979423e-006
```

Iteración #7:

```
jac =

   2.357413367917172  -3.319510629293809  -4.999999999999449
   0.506620190272589   2.158789243318360  -0.771945230775284
   1.999999999995339   1.013340380540129  -1.000000000002110

f0 =

  -9.51296819096115e-010
   1.06464170812615e-010
   4.95175456194374e-010

dx =

  -3.65804453189836e-010
  -7.53000086470254e-011
  -3.12737989599984e-010

x =

   1.178656683592088
   0.506620190196987
  -0.386022615700600

error =   3.65804453189836e-010
```

$X^{(0)} = [-1, -1, -1]^T$

Error menor a 0,01% = 0,0001

Iteración #1:

```
jac =

  -1.999899999995947  -0.735795671511497  -4.999999999997229
  -1.000000000002110  -2.080718851669161  -1.999900000004828
   1.999999999999780  -1.999900000000387  -0.999999999997669

f0 =

   5.26424111765712
   1.84147098480790
  -3.00000000000000

dx =

   1.449257335625956
  -0.310167284489561
   0.518818223503594

x =

   0.449257335625956
  -1.310167284489561
  -0.481181776496406

error =  1.44925733562596
```

Iteración #2:

```
jac =

   0.898614671251963  -0.539576825291377  -5.000000000001670
  -1.310167284489516   0.829445420443831  -0.962263552992670
   1.999999999995339  -2.620234568979640  -1.000000000002110

f0 =

   2.0681911891969476
  -0.3676679393625730
   0.0962347610950673

dx =

  -1.095060634558591
  -0.919754636204389
   0.316086384744355

x =

  -0.645803298932636
  -2.229921920693950
  -0.165095391752051

error =  1.09506063455859
```

Iteración #3:

```
jac =

  -1.291506597866920  -0.215084406460786  -5.000000000001670
  -2.229921920693378  -1.792057263078073  -0.330090783504655
   1.999999999999780  -4.459743841405128  -0.999999999997669

f0 =

   1.027465207254976
  -0.499000693546390
   0.846040566278174

dx =

  -0.27005713382418900
   0.00694567344317222
   0.27495037426789826

x =

  -0.915860432756825
  -2.222976247250778
   0.109854982515848

error =  0.274950374267898
```

Iteración #4:

```
jac =

  -1.831620865513361  -0.216583512633317  -5.000000000000560
  -2.222976247252539  -1.925138072147448   0.219809965029683
   1.999999999999780  -4.445852494514568  -1.000000000002110

f0 =

  7.29527360725343e-002
  7.41634592846896e-002
  4.75478116537253e-005

dx =

   0.02505306139915991
   0.01016247624326228
   0.00497280025340489

x =

  -0.890807371357665
  -2.212813771007515
   0.114827782769253

error =  0.0250530613991599
```

Iteración #5:

```
jac =

  -1.781514742713597  -0.218795759348023  -5.000000000000560
  -2.212813771007571  -1.700232540280400   0.229755565539502
   1.999999999995339  -4.425527542029073  -1.000000000002110

f0 =

  6.14039276765954e-004
  1.28505120644573e-003
  1.02259675918592e-004

dx =

  4.11054393851829e-004
  2.16355684827412e-004
  -3.31195784578675e-005

x =

  -0.890396316963813
  -2.212597415322688
   0.114794663190795

error =   4.11054393851829e-004
```

Iteración #6:

```
jac =

  -1.780692633926995  -0.218843102176569  -5.000000000000560
  -2.212597415323092  -1.695576671968402   0.229689326380900
   1.999999999995339  -4.425094830660115  -1.000000000002110

f0 =

  1.25106116466434e-007
  3.40303768719963e-007
  2.51742191537119e-008

dx =

  1.07730672756005e-007
  5.79690651346996e-008
  -1.58830458005057e-008

x =

  -0.890396209233140
  -2.212597357353623
   0.114794647307749

error =   1.07730672756005e-007
```