>>

>> function [x,Iter] = Muller(f,x1,x3,tol)

Iter=0;

y1= f(x1);

y3= f(x3);

erro=abs(x3-x1);

xOld=0.5\*(x1+x3);

while erro > tol

Iter=Iter+1;

x2=0.5\*(x1+x3);

y2=f(x2);

h=x3-x1;

s1=y1-y3;

s2=y2-y3;

a=(2\*s1-4\*s2)/h^2;

b=(s1-4\*s2)/h;

c=y3;

delta=sqrt(b^2-4\*a\*c);

if (a == 0)

'a == 0'

x=x3-c/b;

else

r1=x3+(-b+delta)/(2\*a);

r2=x3+(-b-delta)/(2\*a);

if and( r1 > x1 , r1 < x3)

x=r1;

end

if and( r2 > x1 , r2 < x3)

x=r2;

end

end

yx=f(x);

if (yx==0)

break

end

if (Iter > 1)

erro=abs(x - xOld);

end

xOld=x;

if (yx\*y1 <0)

x3=x;

y3=yx;

end

if (yx\*y3 <0)

x1=x;

y1=yx;

end

if (yx\*y2 <0)

if (x < x2)

x1=x;

y1=yx;

x3=x2;

y3=y2;

else

x1=x2;

y1=y2;

x3=x;

y3=yx;

end

end

end

endfunction

>> format long

>> tol =1e-14

tol = 1.000000000000000e-14

>> ItMax=500

ItMax = 500

>> '##### 1'

ans = ##### 1

>> f = @(x)x^3-1

f =

@(x) x ^ 3 - 1

>> [root,iter]=Muller(f,0.6,1.5,tol)

root = 1

iter = 4

>> f(root)

ans = 0

>> '##### 2'

ans = ##### 2

>> f =@(x)x^2\*(x^2/3+sqrt(2)\*sin(x))-sqrt(3)/18

f =

@(x) x ^ 2 \* (x ^ 2 / 3 + sqrt (2) \* sin (x)) - sqrt (3) / 18

>> [root,iter]=Muller(f,0.1,1,tol)

root = 3.994222917109682e-01

iter = 6

>> f(root)

ans = 2.775557561562891e-17

>> '##### 3'

ans = ##### 3

>> f =@(x)11\*x^11-1

f =

@(x) 11 \* x ^ 11 - 1

>> [root,iter]=Muller(f,0.1,1,tol)

ans = a == 0

root = 8.041330975036644e-01

iter = 7

>> f(root)

ans = 4.440892098500626e-16

>> '##### 4'

ans = ##### 4

>> f = @(x)x^3+1

f =

@(x) x ^ 3 + 1

>> [root,iter]=Muller(f,-1.8,-0.5,tol)

root = -1

iter = 5

>> f(root)

ans = 0

>> '##### 5'

ans = ##### 5

>> f = @(x)x^3-2\*x-5

f =

@(x) x ^ 3 - 2 \* x - 5

>> [root,iter]=Muller(f,2,3,tol)

root = 2.094551481542327

iter = 5

>> f(root)

ans = -8.881784197001252e-16

>> '##### 6'

ans = ##### 6

>> f = @(x)2\*x\*exp(-5)+1-2\*exp(-5\*x)

f =

@(x) 2 \* x \* exp (-5) + 1 - 2 \* exp (-5 \* x)

>> [root,iter]=Muller(f,0,1,tol)

root = 1.382571550568241e-01

iter = 5

>> f(root)

ans = 0

>> '##### 7'

ans = ##### 7

>> f = @(x)2\*x\*exp(-10)+1-2\*exp(-10\*x)

f =

@(x) 2 \* x \* exp (-10) + 1 - 2 \* exp (-10 \* x)

>> [root,iter]=Muller(f,0,1,tol)

root = 6.931408868702348e-02

iter = 6

>> f(root)

ans = 2.220446049250313e-16

>> '##### 8'

ans = ##### 8

>> f = @(x)2\*x\*exp(-20)+1-2\*exp(-20\*x)

f =

@(x) 2 \* x \* exp (-20) + 1 - 2 \* exp (-20 \* x)

>> [root,iter]=Muller(f,0,1,tol)

root = 3.465735902085385e-02

iter = 6

>> f(root)

ans = 0

>> '##### 9'

ans = ##### 9

>> f = @(x)(1+(1-5)^2)\*x-(1-5\*x)^2

f =

@(x) (1 + (1 - 5) ^ 2) \* x - (1 - 5 \* x) ^ 2

>> [root,iter]=Muller(f,0,0.2,tol)

root = 3.840255184062187e-02

iter = 2

>> f(root)

ans = -7.771561172376096e-16

>> '##### 10'

ans = ##### 10

>> f = @(x)(1+(1-10)^2)\*x-(1-10\*x)^2

f =

@(x) (1 + (1 - 10) ^ 2) \* x - (1 - 10 \* x) ^ 2

>> [root,iter]=Muller(f,0,0.2,tol)

root = 9.900009998000558e-03

iter = 2

>> f(root)

ans = 5.884182030513330e-15

>> '##### 11'

ans = ##### 11

>> f = @(x)(1+(1-20)^2)\*x-(1-20\*x)^2

f =

@(x) (1 + (1 - 20) ^ 2) \* x - (1 - 20 \* x) ^ 2

>> [root,iter]=Muller(f,0,0.2,tol)

root = 2.493750039061977e-03

iter = 2

>> f(root)

ans = -1.387778780781446e-14

>> '##### 12'

ans = ##### 12

>> f = @(x)x^2-(1-x)^5

f =

@(x) x ^ 2 - (1 - x) ^ 5

>> [root,iter]=Muller(f,0,0.9,tol)

root = 3.459548158482420e-01

iter = 6

>> f(root)

ans = -6.938893903907228e-17

>> '##### 13'

ans = ##### 13

>> f = @(x)x^2-(1-x)^10

f =

@(x) x ^ 2 - (1 - x) ^ 10

>> [root,iter]=Muller(f,0,0.9,tol)

root = 2.451223337533072e-01

iter = 7

>> f(root)

ans = 3.469446951953614e-17

>> '##### 14'

ans = ##### 14

>> f = @(x)x^2-(1-x)^20

f =

@(x) x ^ 2 - (1 - x) ^ 20

>> [root,iter]=Muller(f,0,0.9,tol)

ans = a == 0

root = 1.649209572764410e-01

iter = 8

>> f(root)

ans = 6.938893903907228e-18

>> '##### 15'

ans = ##### 15

>> f = @(x)(1+(1-5)^4)\*x-(1-5\*x)^4

f =

@(x) (1 + (1 - 5) ^ 4) \* x - (1 - 5 \* x) ^ 4

>> [root,iter]=Muller(f,0,0.2,tol)

root = 3.617108178904091e-03

iter = 4

>> f(root)

ans = 7.327471962526033e-15

>> '##### 16'

ans = ##### 16

>> f = @(x)(1+(1-10)^4)\*x-(1-10\*x)^4

f =

@(x) (1 + (1 - 10) ^ 4) \* x - (1 - 10 \* x) ^ 4

>> [root,iter]=Muller(f,0,0.2,tol)

root = 1.514713347841074e-04

iter = 3

>> f(root)

ans = 1.425970452828551e-12

>> '##### 17'

ans = ##### 17

>> f = @(x)(1+(1-20)^4)\*x-(1-20\*x)^4

f =

@(x) (1 + (1 - 20) ^ 4) \* x - (1 - 20 \* x) ^ 4

>> [root,iter]=Muller(f,0,0.2,tol)

root = 7.668595122701140e-06

iter = 4

>> f(root)

ans = 6.726164070158802e-11

>> '##### 18'

ans = ##### 18

>> f = @(x)exp(-5\*x)\*(x-1)+x^5

f =

@(x) exp (-5 \* x) \* (x - 1) + x ^ 5

>> [root,iter]=Muller(f,0,1,tol)

root = 5.161535187579335e-01

iter = 6

>> f(root)

ans = -5.551115123125783e-17

>> '##### 19'

ans = ##### 19

>> f = @(x)exp(-10\*x)\*(x-1)+x^10

f =

@(x) exp (-10 \* x) \* (x - 1) + x ^ 10

>> [root,iter]=Muller(f,0,1,tol)

root = 5.395222269084159e-01

iter = 8

>> f(root)

ans = 3.469446951953614e-18

>> '##### 20'

ans = ##### 20

>> f = @(x)exp(-20\*x)\*(x-1)+x^20

f =

@(x) exp (-20 \* x) \* (x - 1) + x ^ 20

>> [root,iter]=Muller(f,0,1,tol)

root = 5.527046666784878e-01

iter = 9

>> f(root)

ans = 1.948175778684891e-20

>> '##### 21'

ans = ##### 21

>> f = @(x)x^2+sin(x/5)-1/4

f =

@(x) x ^ 2 + sin (x / 5) - 1 / 4

>> [root,iter]=Muller(f,0,1,tol)

root = 4.099920179891371e-01

iter = 4

>> f(root)

ans = -2.775557561562891e-17

>> '##### 22'

ans = ##### 22

>> f = @(x)x^2+sin(x/10)-1/4

f =

@(x) x ^ 2 + sin (x / 10) - 1 / 4

>> [root,iter]=Muller(f,0,1,tol)

root = 4.525091455776412e-01

iter = 4

>> f(root)

ans = 0

>> '##### 23'

ans = ##### 23

>> f = @(x)x^2+sin(x/20)-1/4

f =

@(x) x ^ 2 + sin (x / 20) - 1 / 4

>> [root,iter]=Muller(f,0,1,tol)

root = 4.756268485960625e-01

iter = 3

>> f(root)

ans = 5.551115123125783e-17

>>