#########二分法

function binary\_search(f,g,l0,r0,ϵ=0.001)

n=ceil(log(abs(r0-l0)/ϵ)/log(2))

l=l0

r=r0

m=(l0+r0)\*0.5

for i=1:n

gm=g(m)

if abs(gm)<10E-15

return m,f(m)

else

if gm<0

l=m

else r=m

end

end

m=(l+r)\*0.5

end

return m,f(m)

end

binary\_search(x->x^2,x->2\*x,-1,1,0.01)

结果：(0.0, 0.0)

#####黄金分割

function golden\_Search(f,l0,r0,ϵ=0.01)

n = ceil(log(ϵ/abs(l0-r0))/log(0.618))

if l0<r0

l = l0

r = r0

else

if l0>r0

l = r0

r = l0

else

println("ERROR!")

end

end

for i=1:n

l1=l+0.382(r-l)

r1=l+0.618(r-l)

fl1=f(l1)

fr1=f(r1)

if fl1<fr1

r=r1

else

l=l1

end

end

return l,r

end

golden\_Search(x->x^4-14\*x^3+60\*x^2-70\*x,0,2,0.3)

结果：(0.652478180448, 0.944210064)

########菲波那切数列法

function fibonacci(f,l0,r0,ϵ=0.3)

if l0<r0

l = l0

r = r0

else

if l0>r0

l = r0

r = l0

else

println("ERROR!")

end

end

p=0

threshold=abs(r0-l0)/ϵ

fib=[1,2]

n=3

current=fib[n-1]+fib[n-2]

while current<threshold

push!(fib,current)

n+=1

current=fib[n-1]+fib[n-2]

end

push!(fib,current)

for i=1:(n-1)

p=1-fib[n-i]/fib[n-i+1]

l1=l+p\*(r-l)

r1=l+(1-p)\*(r-l)

fl1=f(l1)

fr1=f(r1)

if fl1<fr1

r=r1

else

l=l1

end

end

return l,r,n,p

end

fibonacci(x->x^4-14\*x^3+60\*x^2-70\*x,0,2,0.3)

结果：(0.75, 1.0, 5, 0.5)