In the name of God

Producer:  
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Subject:  
 different of Bysection method whith using monte carlo and normal bysection method.

Date:

12/7/2020

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Issue: We have to execute the two-part method of rooting with the help of Mont Carlo method 100 times and save the number of repetitive steps and a random number until we finally reach the root with the desired accuracy each time we execute and Then get the average of these 100 repetitions.

Our error is .

Solve:

At the first we have a function with a interval.

Then we should make the c,c have a uniform distribution with a=min=min of interval,b=max=max of interval.

Then we should chek this:

Step1:if &3.

Step2 :if f(c)\*f(a)<0,set b=c,

Step3 :if f(c)\*f(a)>0,set a=c,then go to step1.

We do above algorithm until step1 condition is True.

And we do this for bysection method with slect c=(a+b)/2 in each round.

Now we can run our simulation for the above algorithm.

> rm(list=ls())

> n=100

> q=8

> M<-c()

> e<-10^-q

> for(i in 1:n){

+ baze<-c(0,1)

+ a<-baze[1];b<-baze[2]

+ f<-function(c){

+ f=c-(1/2)\*cos(c)

+ }

+ c<-runif(1,a,b)

+

+ m=1

+ while((abs(b-a))>=(e)){

+ c<-runif(1,a,b)

+ if(f(c)\*f(a)<0){b<-c

+ }else{

+ a<-c}

+ m<-m+1}

+ M[i]<-m}

>

> print(paste("the last value c in our function is :",f(c)))

[1] "the last value c in our function is : 7.42429451250359e-11"

> print(paste("the mean of M is :",mean(M)))

[1] "the mean of M is : 38.81"

>

>

> e<-10^-q

> r=0

> baze<-c(0,1)

> a<-baze[1];b<-baze[2]

> c<-(a+b)/2

> while((abs(b-a))>=(e)){

+ c<-(a+b)/2

+ if(f(c)\*f(a)<0){b<-c

+ }else{

+ a<-c}

+ r<-r+1}

> print(r)

[1] 27

Conclusion:

As we have seen, the number of steps in bysection with the help of Mont Carlo has more steps than the simple bysection method(r<mean(m))