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Computer Project 2 (Using R)

Part I

V1<-rnorm(100, 0, 1)

V1.5<-rnorm(100, 0, 1.5)

Procedure A

counter=0

for (i in 1:100){

if (abs(V1[i])<abs(V1.5[i])){

counter=counter+1

}

}

Counter=64

64 out of 100 times we get the correct answer.

Procedure B

V1Squared<-V1^2

V1.5Squared<-V1.5^2

sum(V1Squared)

sum(V1.5Squared)

V1: 104.6257; V1.5: 172.0154

We do get the correct answer.

Procedure C

sqrt(sum((V1-mean(V1))^2)/99)

sqrt(sum((V1.5-mean(V1.5))^2)/99)

V1: 1.025418; V1.5: 1.312184

We do get the correct answer.

Procedure D

V1Log<-log(abs(V1))

V1.5Log<-log(abs(V1.5))

count=0

for (i in 1:100){

if (V1Log[i]<V1.5Log[i]){

count = count + 1

}

}

Count=54

P-value=P(B(100, 0.5)>=54)= 0.24206

0.24206>0.05, so we fail to reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We didn’t get the correct answer.

First pair:

procedure B

77.2152; 219.3794

Procedure C

0.8723916; 1.476942

Procedure D

Count=74

P-value=P(B(100, 0.5)>=74)= < 0.000001

P-value is smaller than 0.05, so we reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We get the correct answer.

Second pair:

Procedure B

104.5513; 216.5358

Procedure C

1.032795; 1.473588

Procedure D

Count=61

P-value=P(B(100, 0.5)>=61)= 0.01760010011

P-value is smaller than 0.05, so we reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We get the correct answer.

Third pair:

Procedure B

95.83705; 193.5369

Procedure C

0.9837614; 1.389923

Procedure D

Count=63

P-value=P(B(100, 0.5)>=63)= 0.00601648786

P-value is smaller than 0.05, so we reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We get the correct answer.

Fourth pair:

Procedure B

101.7467; 234.4768

Procedure C

1.013553; 1.527351

Procedure D

Count=64

P-value=P(B(100, 0.5)>=64)= 0.00331856026

P-value is smaller than 0.05, so we reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We get the correct answer.

Fifth pair:

Procedure B

95.88251; 238.724

Procedure C

0.9807818; 1.501892

Procedure D

Count=54

P-value=P(B(100, 0.5)>=54)= 0.2420592068

P-value is larger than 0.05, so we fail to reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We didn’t get the correct answer.

Part II

V1<-rcauchy(100, location=0, scale=1)

V1.5<-rcauchy(100, location=0, scale=sqrt(1.5))

Procedure A

counter=0

for (i in 1:100){

if (abs(V1[i])<abs(V1.5[i])){

counter=counter+1

}

}

Count=56

56 out of 100 times we get the correct answer.

Procedure B

V1Squared<-V1^2

V1.5Squared<-V1.5^2

sum(V1Squared)

sum(V1.5Squared)

V1: 7501.813; V1.5: 186888

We do get the correct answer.

Procedure C

sqrt(sum((V1-mean(V1))^2)/99)

sqrt(sum((V1.5-mean(V1.5))^2)/99)

V1: 8.70447; V1.5: 43.08464

We do get the correct answer.

Procedure D

V1Log<-log(abs(V1))

V1.5Log<-log(abs(V1.5))

count=0

for (i in 1:100){

if (V1Log[i]<V1.5Log[i]){

count = count + 1

}

}

Count=58

P-value=P(B(100, 0.5)>=58)= 0.06660530961

P-value is larger than 0.05, so we fail to reject the null hypothesis that the distribution of ln|V1.5| is the same as the distribution of ln|V1|.

We didn’t get the correct answer.