**MODERN COLLEGE OF ARTS,SCI. & COMM. PUNE-05.**

**DEPARTMENT OF STATISTICS.**

M.Sc.( I )- ST-15

**EXPT.NO. 8 (B)**

**TITLE : Model sampling from mixture and compound distribution.**

1. Generate a random sample of size 20 from ( 0.3, 0.7 ) mixture of Binomial ( 3, 0.6 )

and p.d.f f1 ( x )= 6 x 1/3 < x < 2/3

0 o. w.

2. Generate a random sample of size 18 from the following p.d.f.

f ( x ) = 0.4 P1 ( x ) + 0.6 f1 ( x ) were P1 ( x ) = B ( 2, 0.5 ) and

f1 ( x )= e x p ( x ) x > 0

= 0 0.w

3. Generate a random sample of size 15 from the following distribution

( 9/10 ) N (0,1) + ( 1/10 ) N ( 0,9 ) also compute mean of the distribution

4. Suppose Y has gamma distribution ( =2,β=3) and x ~ Poisson ( y / B ) then

draw a random sample from the x of size 17.

5. Generate a random sample of size 21 from the noncentral chi-square with

noncenterality parameter θ = 1 with degrees of freedom n=10

[Use the relationship between noncenteral chi-square and central chi-square and

Poisson distribution]

6. Suppose x follows a Poisson distribution with the parameter λ and λ follows an

Exponential distribution with parameter β = 1 then draw a random sample of size

12 from the above distribution.

7. Y follows a binomial distribution with number of trials n = 10 probability of

success P but P is also a random variable P follows beta distribution with parameter

α = 2 and β = 3.

# Model Sampling from Mixture And Compound Distribution

**> #Q1) Solution**

> a1=0.3

> a2=0.7

> n=20

> r1=rbinom(n,3,0.6)# sample from binomial (3,0.6)

> r2=runif(n,0,1)

> x=sqrt((3\*r2+1)/9)

> r3=rep(0,n)

> for(i in 1:20)

+ {

+ if((r2[i]>0)&&(r2[i]<=a1))

+ {r3[i]=r1[i]}

+ else if((r2[i]>a1)&&(r2[i]<=1))

+ {r3[i]=x[i]}

+ }

> r3

[1] 0.6314413 0.5286040 0.5520029 0.5738938 3.0000000 0.6434362 3.0000000

[8] 3.0000000 0.6541229 2.0000000 0.6600728 0.5129724 1.0000000 2.0000000

[15] 0.4881344 2.0000000 0.6351587 0.5621738 0.4758179 0.6190501

**> #Q2) Solution**

> a1=0.4

> a2=0.6

> n=18

> s1=rbinom(n,2,0.5)

> s2=rexp(n,1)# sample from exp(1)

> s3=runif(n,0,1)

> x=rep(0,n)

> for(i in 1:20)

+ {

+ if((s3[i]>0)&&(s3[i]<=a1))

+ {x[i]=s1[i]}

+ else if((s3[i]>a2)&&(s3[i]<=1))

+ {x[i]=s2[i]}

+ }

> x

[1] 1.81829093 1.00000000 1.00000000 1.87333827 1.00000000 0.00000000

[7] 0.04989929 0.00000000 1.00000000 0.00000000 0.00000000 1.00000000

[13] 0.36449754 1.00000000 0.00000000 0.72554972 0.02415113 0.00000000

**> #Q3) Solution**

> a1=0.9

> a2=0.1

> n=15

> s1=rnorm(n,0,1)# sample from N(0,1)

> s2=rnorm(n,0,9)

> s3=runif(n,0,1)

> x=rep(0,n)

> for(i in 1:15)

+ {

+ if((s3[i]>0)&&(s3[i]<=a1))

+ {x[i]=s1[i]}

+ else if((s3[i]>a2)&&(s3[i]<=1))

+ {x[i]=s2[i]}

+ }

> x

[1] -1.569820077 -0.576650065 0.483304541 -2.102811547 -0.318667156

[6] 0.805598482 -1.481745248 -0.741154118 0.001489516 0.368086846

[11] 3.288223512 -0.025218138 0.752622387 -13.712108279 0.930555646

**> #Q4) Solution**

> n=17

> r1=rgamma(n,3,1/2)

> r=rep(0,n)

> for(i in 1:17)

+ {

+ r[i]=rpois(1,r1[i])

+ }

> r

[1] 8 6 5 11 0 3 3 2 5 14 13 11 14 11 17 5 0

**> #Q5) Solution**

> rchisq(21,10,ncp=1)

[1] 10.205117 8.341127 10.250676 12.119915 8.891406 11.838275 15.803453

[8] 5.787829 16.269820 7.862399 21.136496 6.611951 7.351033 3.640205

[15] 12.036262 14.023762 8.232750 9.872883 7.070423 12.561006 10.046682

**> #Q6) Solution**

> n=12

> r1=rexp(n,1)

> r=rep(0,n)

> for(i in 1:12)

+ {

+ r[i]=rpois(1,r1[i])

+ }

> r

[1] 1 0 0 1 0 0 3 0 0 0 8 0

**> #Q7) Solution**

> n=10

> r1=rbeta(n,2,3)

> r=rep(0,n)

> for(i in 1:10)

+ {

+ r[i]=rbinom(10,10,r1[i])

+ }

> r

[1] 1 3 5 2 3 0 9 5 5 4

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