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

**DEPARTMENT OF STATISTICS. (Autonomous)**

M.Sc.( I )- ST-15

EXPT.NO. 10

**TITLE: Computation of probabilities of non-central chi square t and F distribution.**

**1. Let T have t distribution with 10 degrees of freedom find ( |T|>2.228)**

**2. If X has a F distribution with parameter r1=5 and r2 = 10. Find a and b so that**

**P ( F a) = 0.05 and P( F b)= 0.95 and accordingly P ( a < F < b) = 0.90**

**3. X1~ X2 ( n1=8, =2) and X2 ~ X2 (n2=10) then Identify the distribution of F = n2X1/n1X2**

**also find the probabilities**

**i) P[ F > 2.433] ii)P[F  4] iii) P[ 1.8 < F < 2.3] iv) P[1.4  F <2]**

**4. W follows N (δ=2, 1) and random variable V follows X2(10) W and V are**

**independent random variable. Find T = W/ then compute the probabilities. rv/**

**i) P [ T  2] ii) P[ 2< T < 3]**

**5. A random variable X follows non central Chi-square distribution with degrees of**

**freedom n = 12 and non centrality parameter =2. Hence compute the**

**i) P[x>4] ii)P[ 2  x < 3] iii) P [ 1 < x]**

**6. Let X1 and X2 be two independent random variables X1 and Y= X1+ X2 follows**

**X2( r1=8 ,=2) and X2( r=10 ,=2) respectively. Find i) P[X2  2] ii) P[x1>3]**

**iii)P[1 X2  1.5]**

**7. Compute the mean of a random variable that has non central F distribution with**

**degrees of freedom r1= 6 and r2=8 and non centrality parameter = 3.**

**8. Draw a random sample of size 12 from the non central t distribution with degrees of**

**freedom 9 and non centrality parameter δ= 1.5.**

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**> # Q. 1. Let T have t distribution with 10 degrees of freedom find ( |T|>2.228)**

**Solution**

> 1-(pt(2.28,10)-pt(-2.28,10))

[1] 0.04578571

**> #.Q.2**

**2. If X has a F distribution with parameter r1=5 and r2 = 10. Find a and b so that**

**P ( F a) = 0.05 and P( F b)= 0.95 and accordingly P ( a < F < b) = 0.90**

Soution :

> qf(0.05,5,10)

[1] 0.2111904

> qf(0.95,5,10)

[1] 3.325835

**> #.Q.3. X1~ X2 ( n1=8, =2) and X2 ~ X2 (n2=10) then Identify the distribution of F = n2X1/n1X2**

**also find the probabilities**

**i) P[ F > 2.433] ii)P[F  4] iii) P[ 1.8 < F < 2.3] iv) P[1.4  F <2]**

**Solution**

> 1-pf(2.433,8,10,2)

[1] 0.1593178

> pf(4,8,10,2)

[1] 0.9564337

> pf(2.3,8,10,2)-pf(1.8,8,10,2)

[1] 0.1092466

> pf(2,8,10,2)-pf(1.4,8,10,2)  
[1] 0.1875851

**> #Q.4 W follows N (δ=2, 1) and random variable V follows X2(10) W and V are**

**independent random variable. Find T = W/ then compute the probabilities. rv/**

**i) P [ T  2] ii) P[ 2< T < 3]**

**Solution**   
> 1-pt(2,10,2)  
[1*] 0.5190268  
> pt*(3,10,2)-pt(2,10,2)  
[1] 0.2981988  
>

" 1-pt(2,10,2)

**> #.Q.5 A random variable X follows non central Chi-square distribution with degrees of**

**freedom n = 12 and non centrality parameter =2. Hence compute the**

**i) P[x>4] ii)P[ 2  x < 3] iii) P [ 1 < x]**

**Solution**

> 1-pchisq(4,12,2)

[1] 0.9920217

> pchisq(3,12,2)-pchisq(2,12,2)

[1] 0.001761705

> 1-pchisq(1,12,2)

[1] 0.9999944

**> #Q.6. Let X1 and X2 be two independent random variables X1 and Y= X1+ X2 follows**

**X2( r1=8 ,=2) and X2( r=10 ,=2) respectively. Find i) P[X2  2] ii) P[x1>3]**

**iii)P[1 X2  1.5]**

**Solution**

> pchisq(2,2,2)

[1] 0.3457458

> 1-pchisq(3,8,2)

[1] 0.9681387

> pchisq(1.5,2,2)-pchisq(1,2,2)

[1] 0.0851049

**> #Q.7. Compute the mean of a random variable that has non central F distribution with**

**degrees of freedom r1= 6 and r2=8 and non centrality parameter = 3.**

**Solution**

> r1=6

**Solution**

> rt(12,9,1.5)

> r2=8

> u=3#non centrality parameter

> mean=(r2/(r2-2))\*((r1+u)/r1)

**> #Q.8. Draw a random sample of size 12 from the non central t distribution with degrees of**

**freedom 9 and non centrality parameter δ= 1.5.**

**Solution**

[1] 0.1251916 0.9386098 0.8132761 1.6434657 2.2395545 2.5867091 1.8475290

[8] 0.5406882 1.0143392 0.3374185 0.4315563 1.8758744

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