

2019bec053

A28

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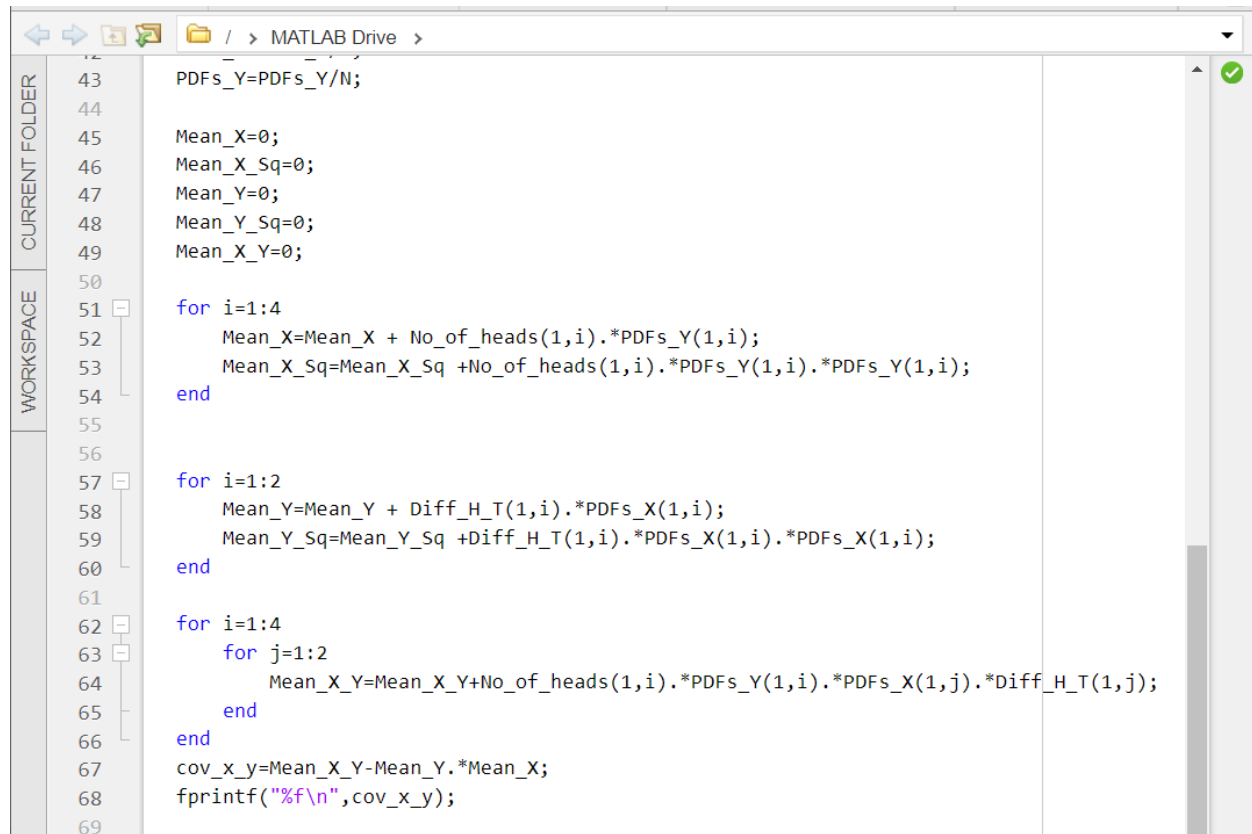
CST_PR_NO 4

Generate the two random variables X & Y of the length is equal to N. Write a code to find out the correlation coefficient between the X & Y. Note:- Assume that N is your registration number (Suppose Registration Number is '2017bec603' then N=2017603.)

Hint:- *

$$\rho = \frac{COV(X, Y)}{\sigma_X \sigma_Y}$$

```
N=2019053;
%yash korekar
%A28
PDFs_X=[0,0];
Diff_H_T=[1,3];
No_of_heads=[0,1,2,3];
PDFs_Y=[0,0,0,0];
for i=1:N
    c1=randsrc(1,1,[1,0;0.5,0.5]);
    c2=randsrc(1,1,[1,0;0.5,0.5]);
    c3=randsrc(1,1,[1,0;0.5,0.5]);
    sample_space=[c1 c2 c3];
    no_of_heads=sum(sample_space);
    no_of_tails=3-sum(sample_space);
    if(no_of_heads>no_of_tails)
        diff_H_T=no_of_heads-no_of_tails;
    else
        diff_H_T=no_of_tails-no_of_heads;
    end
    if (diff_H_T==1)
        PDFs_X(1,1)=PDFs_X(1,1)+1;
    else
        PDFs_X(1,2)=PDFs_X(1,2)+1;
    end
end
```

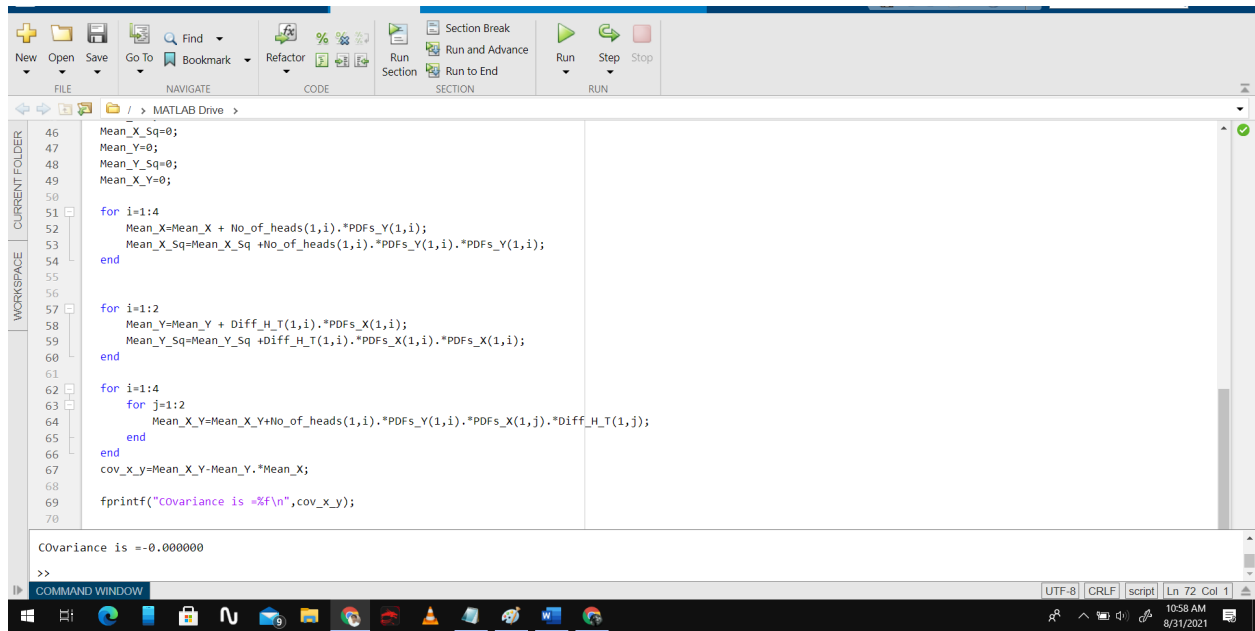



```
43 PDFs_Y=PDFs_Y/N;  
44  
45 Mean_X=0;  
46 Mean_X_Sq=0;  
47 Mean_Y=0;  
48 Mean_Y_Sq=0;  
49 Mean_X_Y=0;  
50  
51 for i=1:4  
52     Mean_X=Mean_X + No_of_heads(1,i).*PDFs_Y(1,i);  
53     Mean_X_Sq=Mean_X_Sq +No_of_heads(1,i).*PDFs_Y(1,i).*PDFs_Y(1,i);  
54 end  
55  
56 for i=1:2  
57     Mean_Y=Mean_Y + Diff_H_T(1,i).*PDFs_X(1,i);  
58     Mean_Y_Sq=Mean_Y_Sq +Diff_H_T(1,i).*PDFs_X(1,i).*PDFs_X(1,i);  
59 end  
60  
61  
62 for i=1:4  
63     for j=1:2  
64         Mean_X_Y=Mean_X_Y+No_of_heads(1,i).*PDFs_Y(1,i).*PDFs_X(1,j).*Diff_H_T(1,j);  
65     end  
66 end  
67 cov_x_y=Mean_X_Y-Mean_Y.*Mean_X;  
68 fprintf("%f\n",cov_x_y);  
69
```

Conclusion:

If covariance of Two Events is zero Then they are independent.

i.e $\text{Mean}_X * \text{Mean}_Y = \text{Mean}_{X_Y}$



The screenshot shows the MATLAB Workspace window. The 'CURRENT FOLDER' tab is selected, and the 'WORKSPACE' tab is also visible. The workspace contains the following variables:

Name	Value	Size	Class
c1	1	1x1	double
c2	1	1x1	double
c3	1	1x1	double
cov_x_y	0	1x1	double
Diff_H_T	[1,3]	1x2	double
diff_H_T	3	1x1	double
i	4	1x1	double
j	2	1x1	double
Mean_X	1.4998	1x1	double
Mean_X_Sq	0.4691	1x1	double
Mean_X_Y	2.2494	1x1	double
Mean_Y	1.4998	1x1	double
Mean_Y_Sq	0.7500	1x1	double
N	2019039	1x1	double
No_of_heads	[0,1,2,3]	1x4	double
no_of_heads	3	1x1	double
no_of_tails	0	1x1	double
PDFs_X	[0.7501,0.2499]	1x2	double
PDFs_Y	[0.1252,0.3745,0.3756,0.1247]	1x4	double
sample_space	[1,1,1]	1x3	double