Jadavpur University, Electronics and Telecommunication
Department

PSR DELAY LIMITED TRANSMISSION

Mayukhmali Das (098)

Date of Submission : 23rd December , 2020

1 Aim of the Experiment

To show Throughput vs Rho analytic approximation graph in PSR delayed limited transmission :

2 Objective

To simulate using the software **MATLAB**

3 Observation and Results

We simulated the circuit in Matlab and obtained the following results.

3.1 Code snippet when random variables are taken as 1

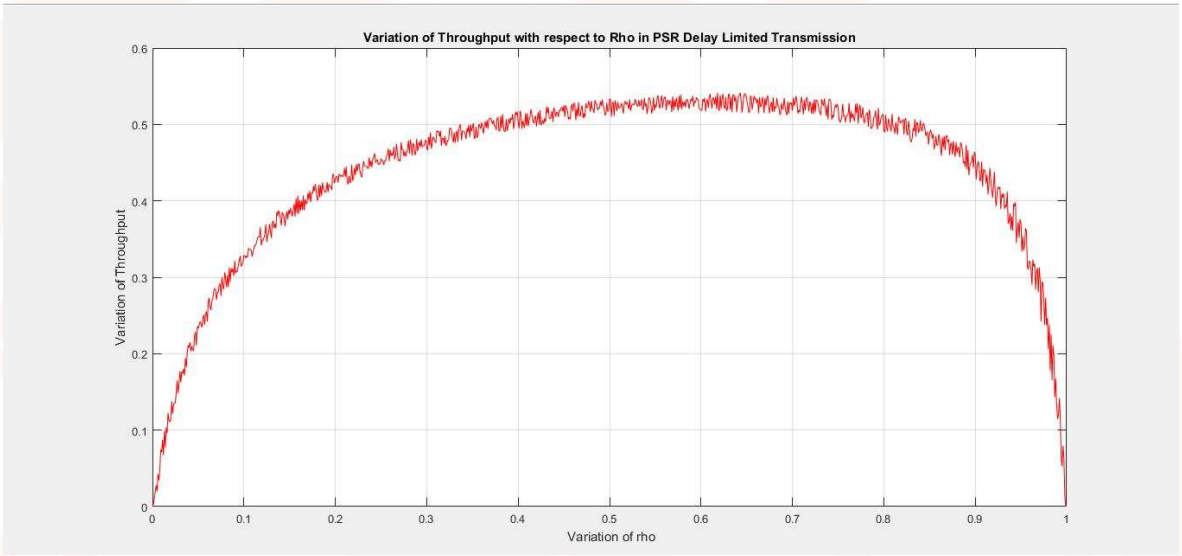
```
count1=1;
h=1;
g=1;
syms x a b c d u R Yo real ;
for rho = 0.00001 : 0.00001 : 0.99999
        Yd=(power(abs(h),4)*power(abs(g),2)*rho*(1-rho))/((power(abs(h),2)*power(abs(g),2)*(0.01+0.01*
        Yo=Yd+rand;
        R=log2(1+Yo);
        a=0.02*Yo*(1-rho);
        b=(0.01+0.01*(1-rho))*0.02*Yo;
        c=rho*(1-rho);
        d=(0.01+0.01*(1-rho))*Yo*rho;
        u=sqrt(4*a/c);
        value=exp(-d/c)*u*abs(besselk(1,u))
        Pout = 1- value;
        if (Pout<=1 )&& (Pout>=0)
          Throughput=(1-(Pout))*R/2;
          arrayx1(count1)=rho;
          arrayy1(count1)=Throughput;
          count1=count1+1;
        end
end
plot(arrayx1,arrayy1,'r');
xlabel(' Variation of rho');
ylabel( ' Variation of Throughput ');
title(' Variation of Throughput with respect to Rho in PSR Delay Limited Transmission ');
grid on;
```

The code is :

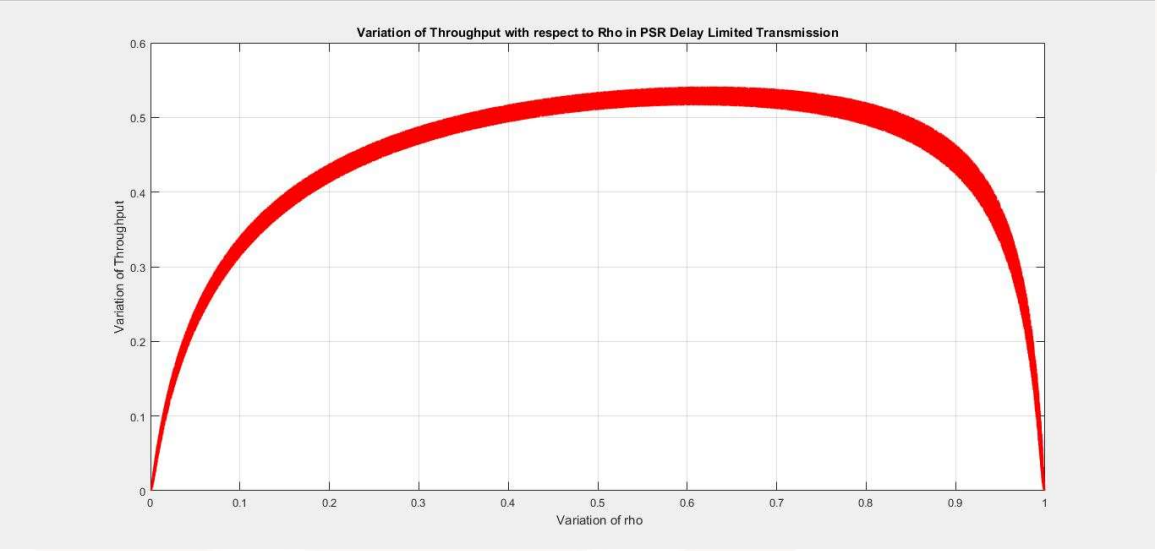
```
clear;
count1=1;
h=1;
g=1;
syms x a b c d u R Yo real ;
for rho = 0.00001 : 0.00001 : 0.99999
Yd=(power(abs(h),4)*power(abs(g),2)*rho*(1-
rho))/((power(abs(h),2)*power(abs(g),2)*(0.01+0.01*(1-
rho))*rho)+(power(abs(h),2)*0.02*(1-rho))+(0.02*(0.01+0.01*(1-
rho))) );
Yo=Yd+rand;
R=log2(1+Yo);
a=0.02*Yo*(1-rho);
b=(0.01+0.01*(1-rho))*0.02*Yo;
c=rho*(1-rho);
d=(0.01+0.01*(1-rho))*Yo*rho;
u=sqrt(4*a/c);
value=exp(-d/c)*u*abs(besselk(1,u))
Pout = 1- value;
if (Pout¡=1 ) and (Pout¿=0)
Throughput=(1-(Pout))*R/2;
arrayx1(count1)=rho;
arrayy1(count1)=Throughput;
count1=count1+1;
end
end
plot(arrayx1,arrayy1,'r');
xlabel(' Variation of rho');
ylabel( ' Variation of Throughput ');
title(' Variation of Throughput with respect to Rho in PSR Delay
Limited Transmission ');
grid on;
```

4 Graphs

Graph for less input values of Rho :



Graph for more input values of Rho :



5 Conclusion

Taking the modulus of the modified bessel function of the second kind generates the appropriate graph