

---

```

clc;
clear all;
close all;

N = 100000;
X = randi([0,1],[1,N]);
L = 2;

n = 1;
for i = 1:2:N
    if (X(i) == 0) && (X(i+1) == 0)
        qpsk(n) = (1+1j)/sqrt(2);
    elseif (X(i) == 0) && (X(i+1) == 1)
        qpsk(n) = (-1+1j)/sqrt(2);
    elseif (X(i) == 1) && (X(i+1) == 0)
        qpsk(n) = (-1-1j)/sqrt(2);
    elseif (X(i) == 1) && (X(i+1) == 1)
        qpsk(n) = (1-1j)/sqrt(2);
    end
    n = n+1;
end

h1 = (1/sqrt(2)).*complex(randn(1,N/2),randn(1,N/2));
h2 = (1/sqrt(2)).*complex(randn(1,N/2),randn(1,N/2));
n1 = complex(randn(1,N/2),randn(1,N/2));
n2 = complex(randn(1,N/2),randn(1,N/2));
normsq_h = h1.*conj(h1) + h2.*conj(h2);

SNR_dB = 0:4:24;
l = length(SNR_dB);

for i = 1:l
    SNR_lin(i) = 10^(SNR_dB(i)/10);
    sigma(i) = 1/sqrt(SNR_lin(i));
    y1 = h1.*qpsk + sigma(i)*n1;
    y2 = h2.*qpsk + sigma(i)*n2;
    Dec = ((conj(h1).*y1)+(conj(h2).*y2))./normsq_h;
    n = 1;
    for j = 1:N/2
        if (real(Dec(j))>0) && (imag(Dec(j))>0)
            X_rcvd(n) = 0;
            X_rcvd(n+1) = 0;
        elseif (real(Dec(j))<0) && (imag(Dec(j))>0)
            X_rcvd(n) = 0;
            X_rcvd(n+1) = 1;
        elseif (real(Dec(j))<0) && (imag(Dec(j))<0)
            X_rcvd(n) = 1;
            X_rcvd(n+1) = 0;
        elseif (real(Dec(j))>0) && (imag(Dec(j))<0)
            X_rcvd(n) = 1;
            X_rcvd(n+1) = 1;
        end
    end
end

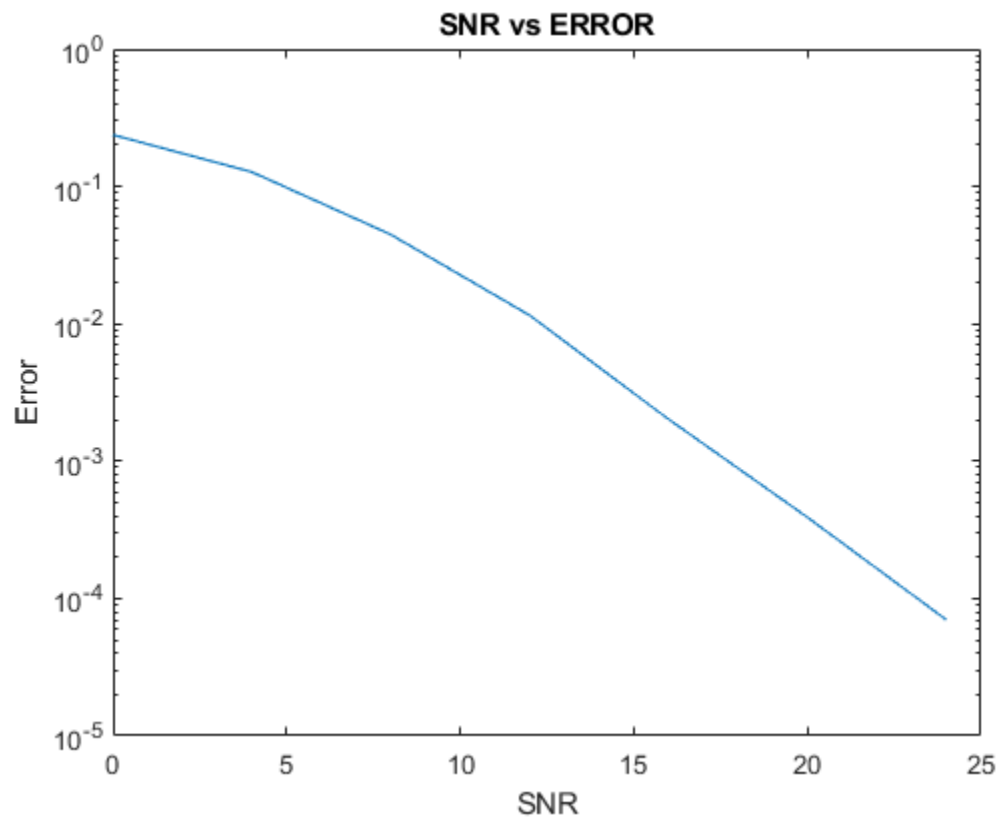
```

---

---

```
        n = n+2;
    end
    e(i) = sum(abs(X-X_rcvd))/N;
end

semilogy(SNR_dB,e);
xlabel('SNR');ylabel('Error');
title('SNR vs ERROR');
```



*Published with MATLAB® R2018b*