

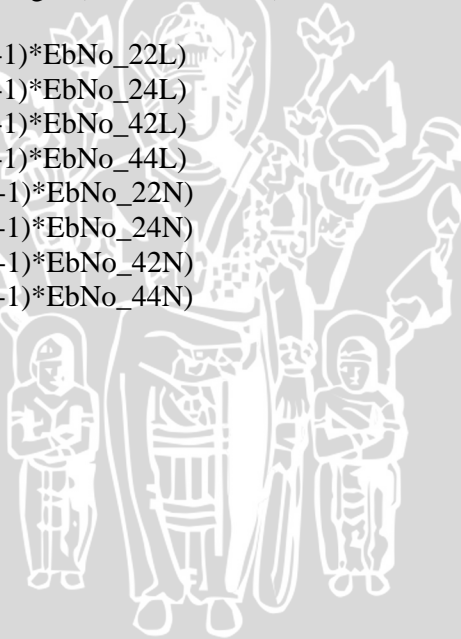

```
SNR_OFDMAN1=10.*log10((1-CP)*(10.^(SNR_N1/10)))
SNR_22L=2/2*SNR_OFDMAL1 %SNR sistem multi antena
SNR_24L=2/4*SNR_OFDMAL1
SNR_42L=4/2*SNR_OFDMAL1
SNR_44L=4/4*SNR_OFDMAL1
SNR_22N=2/2*SNR_OFDMAN1
SNR_24N=2/4*SNR_OFDMAN1
SNR_42N=4/2*SNR_OFDMAN1
SNR_44N=4/4*SNR_OFDMAN1
```

%Persamaan Eb/No

```
EbNo_22L=SNR_22L-10*log10(Bsistem1/Rtot1) %Eb/No sistem multi antena
EbNo_24L=SNR_24L-10*log10(Bsistem1/Rtot1)
EbNo_42L=SNR_42L-10*log10(Bsistem1/Rtot1)
EbNo_44L=SNR_44L-10*log10(Bsistem1/Rtot1)
EbNo_22N=SNR_22N-10*log10(Bsistem1/Rtot1)
EbNo_24N=SNR_24N-10*log10(Bsistem1/Rtot1)
EbNo_42N=SNR_42N-10*log10(Bsistem1/Rtot1)
EbNo_44N=SNR_44N-10*log10(Bsistem1/Rtot1)
```

%Persamaan BER

```
x_22L=sqrt(3*M1./(Mod1-1)*EbNo_22L)
x_24L=sqrt(3*M1./(Mod1-1)*EbNo_24L)
x_42L=sqrt(3*M1./(Mod1-1)*EbNo_42L)
x_44L=sqrt(3*M1./(Mod1-1)*EbNo_44L)
x_22N=sqrt(3*M1./(Mod1-1)*EbNo_22N)
x_24N=sqrt(3*M1./(Mod1-1)*EbNo_24N)
x_42N=sqrt(3*M1./(Mod1-1)*EbNo_42N)
x_44N=sqrt(3*M1./(Mod1-1)*EbNo_44N)
aa1L=exp(-(x_22L).^2)
aa2L=exp(-(x_24L).^2)
aa3L=exp(-(x_42L).^2)
aa4L=exp(-(x_44L).^2)
aa1N=exp(-(x_22N).^2)
aa2N=exp(-(x_24N).^2)
aa3N=exp(-(x_42N).^2)
aa4N=exp(-(x_44N).^2)
bb1L=sqrt(phi*x_22L)
bb2L=sqrt(phi*x_24L)
bb3L=sqrt(phi*x_42L)
bb4L=sqrt(phi*x_44L)
bb1N=sqrt(phi*x_22N)
bb2N=sqrt(phi*x_24N)
bb3N=sqrt(phi*x_42N)
bb4N=sqrt(phi*x_44N)
erfc_22L=aa1L./bb1L
erfc_24L=aa2L./bb2L
erfc_42L=aa3L./bb3L
erfc_44L=aa4L./bb4L
erfc_22N=aa1N./bb1N
```



```

erfc_24N=aa2N./bb2N
erfc_42N=aa3N./bb3N
erfc_44N=aa4N./bb4N
Pbe_22L=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_22L %BER sistem multi antena
Pbe_24L=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_24L
Pbe_42L=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_42L
Pbe_44L=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_44L
Pbe_22N=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_22N
Pbe_24N=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_24N
Pbe_42N=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_42N
Pbe_44N=4*(sqrt(Mod1)-1)/sqrt(Mod1)/M1*erfc_44N

```

%Grafik Pengaruh Jarak Terhadap BER

figure (1)

```
plot (d,Pbe_22L,'-^blue');
```

```
hold on
```

```
grid on
```

```
legend('MIMO2x2')
```

```
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi LOS');
```

```
xlabel('Jarak antara eNB dan UE (m)');
```

```
ylabel('BER sistem');
```

```
figure (2)
```

```
plot (d,Pbe_24L,'-^red');
```

```
hold on
```

```
grid on
```

```
legend('MIMO2x4')
```

```
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi LOS');
```

```
xlabel('Jarak antara eNB dan UE (m)');
```

```
ylabel('BER sistem');
```

```
figure (3)
```

```
plot (d,Pbe_42L,'-^black');
```

```
hold on
```

```
grid on
```

```
legend('MIMO4x2')
```

```
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi LOS');
```

```
xlabel('Jarak antara eNB dan UE (m)');
```

```
ylabel('BER sistem');
```

```
figure (4)
```

```
plot (d,Pbe_44L,'-^green');
```

```
hold on
```

```
grid on
```

```
legend('MIMO 4x4')
```

```
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi LOS');
```

```
xlabel('Jarak antara eNB dan UE (m)');
```

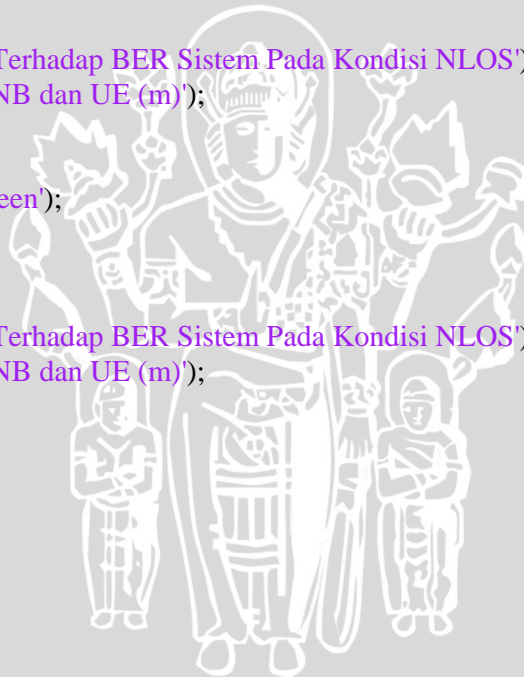
```
ylabel('BER sistem');
```

```
figure (5)
```

```
plot (d,Pbe_22N,'-^blue');
```

```
hold on
```

```
grid on
legend('MIMO 2x2')
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi NLOS');
xlabel('Jarak antara eNB dan UE (m)');
ylabel('BER sistem');
figure (6)
plot (d,Pbe_24N,'-^red');
hold on
grid on
legend('MIMO2x4')
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi NLOS');
xlabel('Jarak antara eNB dan UE (m)');
ylabel('BER sistem');
figure (7)
plot (d,Pbe_42N,'-^black');
hold on
grid on
legend('MIMO4x2')
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi NLOS');
xlabel('Jarak antara eNB dan UE (m)');
ylabel('BER sistem');
figure (8)
plot (d,Pbe_44N,'-^green');
hold on
grid on
legend('MIMO 4x4')
title('Pengaruh Jarak Terhadap BER Sistem Pada Kondisi NLOS');
xlabel('Jarak antara eNB dan UE (m)');
ylabel('BER sistem');
```



%Persamaan Bandwidth Sistem

Rsub1=Rtot1./N

Tsub1=M1./Rsub1

Tcp1=CP.*Tsub1

Ts1=Tsub1-Tcp1

Bsistem1=(2./Ts1)+((N-1)./((1-CP).*Ts1)) %bandwidth sistem 64-QAM

%Persamaan Redaman Propagasi

PL=20*(log10(4*phi*d*f/c))

Pr=Pt+Gt+Gr-PL-FM

%Persamaan Daya Noise

No1=10.*log10(k*T)+10*log10(Bsistem1)+NF %daya noise sistem 64-QAM

%Persamaan SNR

SNR=Pr-No1

SNR_OFDMA=10.*log10((1-CP)*(10.^(SNR/10)))

SNR_22=2/2*SNR_OFDMA

SNR_24=2/4*SNR_OFDMA

SNR_42=4/2*SNR_OFDMA

SNR_44=4/4*SNR_OFDMA

%Persamaan Kapasitas Kanal

C_22=B*log2(1+10.^(SNR_22/10))

C_24=B*log2(1+10.^(SNR_24/10))

C_42=2*B*log2(1+10.^(SNR_42/10))

C_44=2*B*log2(1+10.^(SNR_44/10))

%Grafik Pengaruh Jarak Terhadap Kapasitas Kanal Sistem Multi Antena

figure (1)

plot (d,C_22,'-^blue');

hold on

grid on

legend('MIMO2x2')

title('Pengaruh Jarak Terhadap Kapasitas Kanal');

xlabel('Jarak antara eNB dan UE (m)');

ylabel('Kapasitas kanal sistem (bps)');

figure (2)

plot (d,C_24,'-^red');

hold on

grid on

legend('MIMO2x4')

title('Pengaruh Jarak Terhadap Kapasitas Kanal');

xlabel('Jarak antara eNB dan UE (m)');

ylabel('Kapasitas kanal sistem (bps)');

figure (3)

plot (d,C_42,'-^black');

hold on

grid on

legend('MMO4x2')

```
title('Pengaruh Jarak Terhadap Kapasitas Kanal');
xlabel('Jarak antara eNB dan UE (m)');
ylabel('Kapasitas kanal sistem (bps)');
```

```
figure (4)
plot(d,C_44,'-^green');
hold on
grid on
legend('MIMO 4x4')
```

```
title('Pengaruh Jarak Terhadap Kapasitas Kanal');
xlabel('Jarak antara eNB dan UE (m)');
ylabel('Kapasitas kanal sistem (bps)');
```

