**Dispersion**

clc;

clear all;

close all;

s0=0.0970; %ps/nm2km

n2=1.48;

delta=0.002;

V=2.4;

c=300000;

derivative=0.26;

lamda0=1310; %nm

lamda=1250:10:1600;

%axis([-6.4\*10^(-5) 20\*10^(-6) 1250 1600])

%material dispersion

s=((lamda0)^(4))./((lamda).^(3));

s1=(lamda-s);

d1=s0.\*s1;

d3=d1/4;

plot(lamda,d3,':')

hold on;

%waveguide dispersion

d0=(-(n2\*delta\*derivative)./(c.\*lamda)).\*10^(12);

% %subplot(3,1,2)

plot(lamda,d0,'--')

hold on;

d=d3+d0;

% ubplot(3,1,3)

plot(lamda,d)

hold on;

**Exp 1**

n1=1.47; %core

n2=1.46; %cladding

lamda=1550\*(10^(-9));

as=3\*10^(-6);

am=25\*10^(-6);

thetai=input('Enter incidence angle in degrees=')

na=sqrt((n1\*n1)-(n2\*n2))

thetaa=asind(na)

phic=asind(n2/n1)

vs=(2\*pi\*na\*as)/lamda

vm=(2\*pi\*na\*am)/lamda

m=(vm\*vm)/2

phi=acosd(sind(thetai)/n1)

if(thetai<thetaa)

if(phi<phic)

display('Total internal reflection absent')

else

display('Total internal reflection present')

end

else

display('Total internal reflection absent')

end

n1=1.47;

n2=1.46;

a=25;

delta=((n1\*n1)-(n2\*n2))/(2\*n1\*n1);

alpha=1;

r=-50:1:50

for i=1:1:length(r)

if(abs(r(i))<=a)

n(i)=n1\*sqrt((1-(2\*delta\*((abs(r(i))/a)^(alpha)))));

end

if(abs(r(i))>a)

n(i)=n2;

end

end

subplot(2,2,1);

plot(r,n)

grid on;

xlabel('Radial Distance');

ylabel('Refractive Index');

title('For alpha=1')

alpha1=2;

r=-50:1:50

for i=1:1:length(r)

if(abs(r(i))<=a)

n(i)=n1\*sqrt((1-(2\*delta\*((abs(r(i))/a)^(alpha1)))));

end

if(abs(r(i))>a)

n(i)=n2;

end

end

subplot(2,2,2);

plot(r,n)

grid on;

xlabel('Radial Distance');

ylabel('Refractive Index');

title('For alpha=2')

alpha2=4;

r=-50:1:50

for i=1:1:length(r)

if(abs(r(i))<=a)

n(i)=n1\*sqrt((1-(2\*delta\*((abs(r(i))/a)^(alpha2)))));

end

if(abs(r(i))>a)

n(i)=n2;

end

end

subplot(2,2,3);

plot(r,n)

grid on;

xlabel('Radial Distance');

ylabel('Refractive Index');

title('For alpha=4')

alpha=inf;

r=-50:1:50

for i=1:1:length(r)

if(abs(r(i))<=a)

n(i)=n1\*sqrt((1-(2\*delta\*((abs(r(i))/a)^(alpha)))));

end

if(abs(r(i))>a)

n(i)=n2;

end

end

subplot(2,2,4);

plot(r,n)

grid on;

xlabel('Radial Distance');

ylabel('Refractive Index');

title('For alpha=inf')