```
% matlab mini project
% reflatance throught multidimensional struture
% by - ASHWINI MALVIYA (21118024), AKASHAT SINGH (21122007)
clear all
clc
clf
f2=figure ;
figure(f2)
%tij= transminssion coeffcient for transmision of wave form medium i to j
% rij= relection coefficient for wave coming form medium i and reflected in
% medium i , ohter side mid is j
% further transmission coefficient is given by tij= (nj-ni)/(nj+ni)
% reflection coefficent is given by  rij=(2ni)/(ni+nj)
n0=1; % taking refractive index
n1=1.25;
n2=1.5;
n3=1;
k=2*pi/(650*10^(-9)); % wave vector k = 2*pi /lamda is order of  10^7
t01 = (n0-n1) /(n0+n1);  % relation between trasmission coefficent and refradctive indices
r01=2*n0/(n0+n1);% relation between reflection coefficent and refractive indices
t12=(n1-n2)/(n1+n2);
r12=2*n1/(n1+n2);
t23=(n2-n3)/(n2+n3);
r23=(2*n2)/(n2+n3);
Rf=[];
Tf=[]; % taking empty vectors
for thetai=0.00:0.01:3.1 % taking values of theta or incident angle in radians.
thetat1=asin((n0/n1)*(sin(thetai)));
thetat2=asin((n1/n2)*(sin(thetat1)));
thetat=asin((n2/n3)*(sin(thetat2)));
% now we can write the equation as in matrix form as
matrix1=[1 r01; r01 1]*(1/t01);
% the coefficent is given by c= (kz*L1+ kz*xl1)
kx=k*sin(thetai);
kz1=kx/tan(thetat1);
L1=pi/k;     % taking length as given to be lamda by 2 ;
xl1=L1*tan(thetat1);
c1=(kz1*L1+ kx*xl1);
% creating matrix for various interfaces.
matrix21=[cos(c1) 0;0 cos(c1)];
matrix22=[sin(-c1) 0;0 sin(c1)];
matrix3=[1 r12 ; r12 1] *(1/t12);
kz2=kx/tan(thetat2);
L2=pi/k;
xL2=L2*tan(thetat2);
c2=(kz2*L2+ kx*xL2);
matrix41=[cos(c2) 0;0 cos(c2)];
matrix42=[sin(-c2) 0;0 sin(c2)];
matrix5=[1 0;r23 0]*(1/t23);
mf1=matrix1*matrix21*matrix3*matrix41*matrix5;  % final matrix
mf2=matrix1*matrix22*matrix3*matrix42*matrix5;
a21sq= mf1(2,1)^2 + mf2(2,1)^2;      % calculating coefficients
% since wave equation involve complex terms as well so calculating real and
% imaginary part seprately.
a11sq= mf1(1,1)^2 + mf2(1,1)^2;
R = a11sq/a21sq; % calculating Reflectance throught coefficients
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Rf=[Rf R];
end
x=[0.00:0.01:3.1 ];
plot(x,Rf);
xlabel('Angle of incident in rad');
ylabel('Reflectance ');
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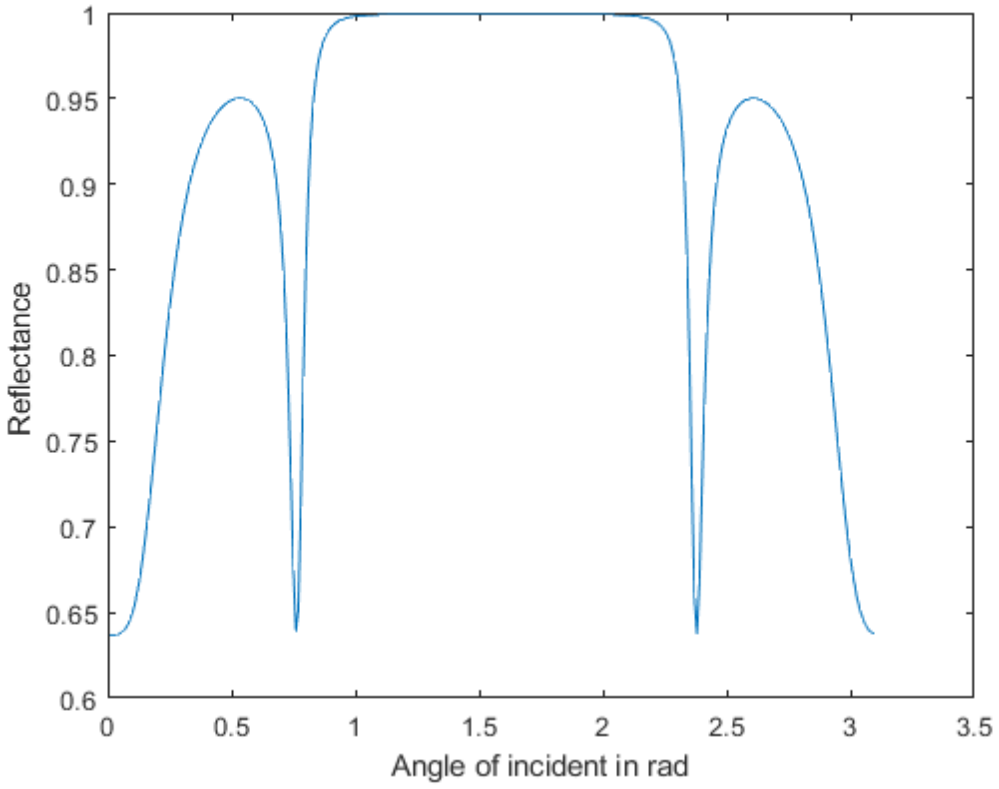

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