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★★★★★★★

APPENDIX

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%% For Linear_Normal Arrangements.............
clc;
clear all;
c = 3*10^8; D = 1000*10^-9; d = (7*D/4);
n0 = 1.0; n1 = 1.5; a = d/n1;
ni = 4.5; nf = 1.5; nL = (ni+nf)/2; b = d/nL;
fq = 150*10^12:0.1*10^12:450*10^12;
for j=1:1:length(fq)
k0 = n0*2*pi*(fq(j)/c); k1 = n1*2*pi*(fq(j)/c);
xi = 2*pi*ni*(fq(j)/c); xf = 2*pi*nf*(fq(j)/c);
Af = 2*pi*(nf-ni)*(fq(j)/(c*b));
z0 = (xi^2)/(2*Af); z1 = (xf^2)/(2*Af);
Ji = besselj(1/4,z0); Jf = besselj(1/4,z1);
J0i = besselj(-3/4,z0); J1i = besselj(5/4,z0);
J0f = besselj(-3/4,z1); J1f = besselj(5/4,z1);
Jdi = (1/2)*(J0i - J1i); Jdf = (1/2)*(J0f - J1f);
Yi = bessely(1/4,z0); Yf = bessely(1/4,z1);
Y0i = bessely(-3/4,z0); Y1i = bessely(5/4,z0);
Y0f = bessely(-3/4,z1); Y1f = bessely(5/4,z1);
Ydi = (1/2)*(Y0i - Y1i); Ydf = (1/2)*(Y0f - Y1f);
ci = Af/(2*(xi^(1/2))); cf = Af/(2*(xf^(1/2)));
L0 = [1 1;-1i*k0 1i*k0];
Li = [xi^(1/2)*Ji xi^(1/2)*Yi;ci*Ji+xi^(3/2)*Jdi
ci*Yi+xi^(3/2)*Ydi];
Lf = [xf^(1/2)*Jf xf^(1/2)*Yf;cf*Jf+xf^(3/2)*Jdf
cf*Yf+xf^(3/2)*Ydf];
L1 = [1 1;-1i*k1 1i*k1];
L11 = [exp(-1i*k1*a) exp(1i*k1*a);-1i*k1*exp(-1i*k1*a)
1i*k1*exp(1i*k1*a)];
M1 = L1*L11^-1*Li*Lf^-1*L1*L11^-1;
%%Band structure......
K(j)=(1/(2*a+b))*acos((M1(1,1)+M1(2,2))/2);
%%Reflection......
M = L0^-1*M1^10*L0; r = M(2,1)/M(1,1);
R(j) = abs®^2;
X(j) = 1i*log(r/abs®);
t = 1/M(1,1); T(j) = abs(t)^2;
end
plot(fq*10^-12,K)
% plot(fq*10^-12,T);
```

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```
% % FOR EXPONENTIAL_NORMAL ARRANGEMENT.....................
clear all;
c = 3*10^8;
D = 1000*10^-9; d = (6*D/4);
n0 = 1.0; ns = 1.0; n1 = 1.5; a = d/n1;
ni = 4.5; nf = 1.5; nE = (ni+nf)/2; b = d/nE;
L = a+b; f0 = 300*10^12;
fq = 150*10^12:0.1*10^12:450*10^12;
for j=1:1:length(fq)
k1 = n1*2*pi*(fq(j)/c); ki = 2*pi*ni*(fq(j)/c);
kf = 2*pi*nf*(fq(j)/c); y = (1/b)*log(nf/ni);
zi = ki/y; zf = kf/y;
J0 = besselj(0,zi); J1 = besselj(1,zi);
J01 = besselj(0,zf); J11 = besselj(1,zf);
Y0 = bessely(0,zi); Y1 = bessely(1,zi);
Y01 = bessely(0,zf); Y11 = bessely(1,zf);
E0 = [1 1;1i*n0 -1i*n0]; E1 = [1 1;1i*n1 -1i*n1];
E11 = [exp(-1i*k1*a) exp(1i*k1*a);1i*n1*exp(-1i*k1*a) -
1i*n1*exp(1i*k1*a)];
Ei = [J0 Y0;ni*J1 ni*Y1]; Ef = [J01 Y01;nf*J11 nf*Y11];
Es = [1 1;1i*ns -1i*ns];                                    %
Substrate is also air.
E = Ei*(inv(Ef))*E1*(inv(E11));       % for
Nor_Exponential.
%%Band structure
KE(j)=(1/(2*a+b))*acos((E3(1,1)+E3(2,2))/2);
%Reflectance
ME = (inv(E0))*(E^10)*Es;
rE = ME(2,1)/ME(1,1);
RE(j) = abs(rE)^2;
XE(j) = 1i*log(rE/abs(rE));
%Transmittance
tE = 1/ME(1,1);
TE(j) = abs(tE)^2;
end
plot(fq*10^-12, KE);
% plot(XE, fq*10^-12);
```

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