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```
clc
clear all
```

Problem 1

```
rho = 39.7*10^3;
Sigma_f = 18.7;
Q = 2.96*10^(-11);
v = 1.08*10^7;
l = 10^(-8);
n1 = 10^6;
k = 2;

A = Sigma_f*v*Q*n1*l;

g = [1 2 3 4 5 6 7 8 9 10];

Y1 = zeros(1,length(g));
Y2 = zeros(1,length(g));

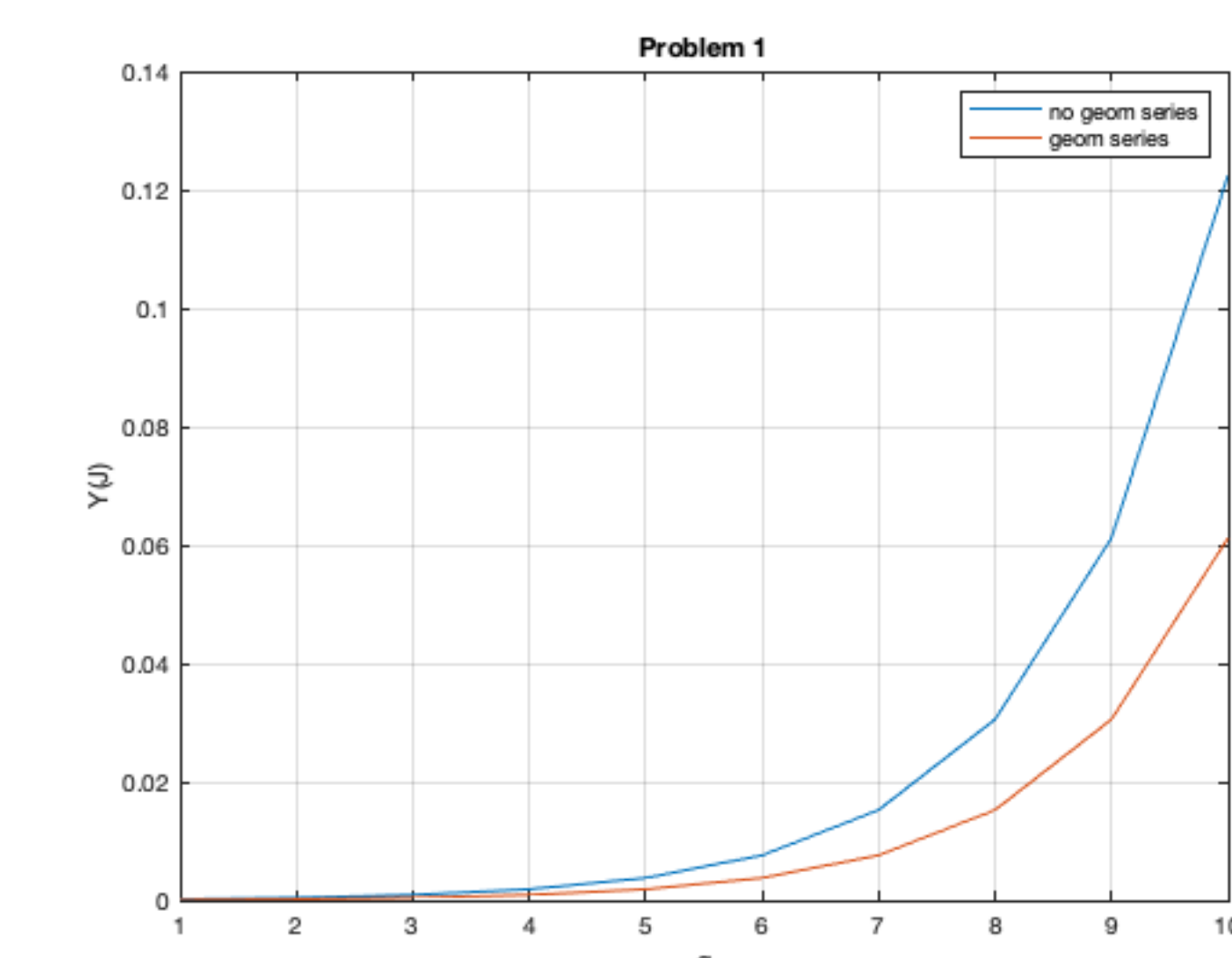
Y1(1,1) = A*(1+k);
Y1(1,2) = A*(1+k*k^2);
Y1(1,3) = A*(1+k*k^2 + k^3);
Y1(1,4) = A*(1+k + k^2 + k^3 + k^4);
Y1(1,5) = A*(1+k+ k^2 + k^3 + k^4 + k^5);
Y1(1,6) = A*(1+k+ k^2 + k^3 + k^4 + k^5 + k^6);
Y1(1,7) = A*(1+k+ k^2 + k^3 + k^4 + k^5 + k^6 + k^7);
Y1(1,8) = A*(1+k+ k^2 + k^3 + k^4 + k^5 + k^6 + k^7 + k^8);
Y1(1,9) = A*(1+k+ k^2 + k^3 + k^4 + k^5 + k^6 + k^7 + k^8 + k^9);
Y1(1,10) = A*(1+k + k^2 + k^3 + k^4 + k^5 + k^6 + k^7 + k^8 + k^9 + k^10);

for i = 1:length(g)

    Y2(1,i) = A*((k^g(1,i) - 1)/(k-1));

end

figure(1)
plot(g,Y1)
grid on
hold on
plot(g,Y2)
xlabel('g')
ylabel('Y(i)')
legend('no geom series','geom series')
title('Problem 1')
```



Problem 6

```
% Example Values
R = 0.05;
rho = 3.97*10^4;
N = 10.0*10^28;
Sigma_a = 19.8;
Sigma_tr = 66.0;

k_inf = 2.83;
v = 1.08*10^7;

alpha0 = 1.0*10^-8;

tol = 0.001;
Alpha(1,1) = alpha0;

% first iteration
Sigma_trs = Sigma_tr + alpha0/v;
D = 1/(3*Sigma_trs);
Rs = R + 2*D;
B1 = (pi/Rs);
alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
Alpha(1,2) = alpha;
del = abs(alpha - alpha0)/(10^8);
I = 2;

while tol - del < 0

    Sigma_trs = Sigma_tr + Alpha(1,I)/v;
    D = 1/(3*Sigma_trs);
    Rs = R + 2*D;
    B1 = (pi/Rs);
    alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
    I = I+1;
    Alpha(1,I) = alpha;
    del = abs(Alpha(1,I) - Alpha(1,I-1))/(10^8);

end

I
Alpha(1,I)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Double Sigma_a Values
R = 0.05;
rho = 3.97*10^4;
N = 10.0*10^28;
Sigma_a = 2*19.8;
Sigma_tr = 66.0;

k_inf = 2.83;
v = 1.08*10^7;

alpha0 = 1.0*10^-8;

tol = 0.001;
Alpha(1,1) = alpha0;

% first iteration
Sigma_trs = Sigma_tr + alpha0/v;
D = 1/(3*Sigma_trs);
Rs = R + 2*D;
B1 = (pi/Rs);
alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
Alpha(1,2) = alpha;
del = abs(alpha - alpha0)/(10^8);
I = 2;

while tol - del < 0

    Sigma_trs = Sigma_tr + Alpha(1,I)/v;
    D = 1/(3*Sigma_trs);
    Rs = R + 2*D;
    B1 = (pi/Rs);
    alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
    I = I+1;
    Alpha(1,I) = alpha;
    del = abs(Alpha(1,I) - Alpha(1,I-1))/(10^8);

end

I
Alpha(1,I)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Double Sigma_tr Values
R = 0.05;
rho = 3.97*10^4;
N = 10.0*10^28;
Sigma_a = 19.8;
Sigma_tr = 2*66.0;

k_inf = 2.83;
v = 1.08*10^7;

alpha0 = 1.0*10^-8;

tol = 0.001;
Alpha(1,1) = alpha0;

% first iteration
Sigma_trs = Sigma_tr + alpha0/v;
D = 1/(3*Sigma_trs);
Rs = R + 2*D;
B1 = (pi/Rs);
alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
Alpha(1,2) = alpha;
del = abs(alpha - alpha0)/(10^8);
I = 2;

while tol - del < 0

    Sigma_trs = Sigma_tr + Alpha(1,I)/v;
    D = 1/(3*Sigma_trs);
    Rs = R + 2*D;
    B1 = (pi/Rs);
    alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
    I = I+1;
    Alpha(1,I) = alpha;
    del = abs(Alpha(1,I) - Alpha(1,I-1))/(10^8);

end

I
Alpha(1,I)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Double Sigma_tr & Sigma_a Values
R = 0.05;
rho = 3.97*10^4;
N = 10.0*10^28;
Sigma_a = 2*19.8;
Sigma_tr = 2*66.0;

k_inf = 2.83;
v = 1.08*10^7;

alpha0 = 1.0*10^-8;

tol = 0.001;
Alpha(1,1) = alpha0;

% first iteration
Sigma_trs = Sigma_tr + alpha0/v;
D = 1/(3*Sigma_trs);
Rs = R + 2*D;
B1 = (pi/Rs);
alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
Alpha(1,2) = alpha;
del = abs(alpha - alpha0)/(10^8);
I = 2;

while tol - del < 0

    Sigma_trs = Sigma_tr + Alpha(1,I)/v;
    D = 1/(3*Sigma_trs);
    Rs = R + 2*D;
    B1 = (pi/Rs);
    alpha = v*(Sigma_a*(k_inf-1) - (B1^2)*D);
    I = I+1;
    Alpha(1,I) = alpha;
    del = abs(Alpha(1,I) - Alpha(1,I-1))/(10^8);

end

I
Alpha(1,I)
```

```
I =
    6

ans =
    2.7276e+08

I =
    6

ans =
    6.9281e+08

I =
    5

ans =
    3.1615e+08

I =
    5

ans =
    7.1983e+08
```