

```
clc;
clear all;

%%%%%%%%%%%%%
% Parameters %
%%%%%%%%%%%%%

theta = [0:1:360];
alpha = 1;
epsilonA = [0:.5:1.5];
epsilonR = [1.7 2];
epsilonH = [0 .5];

plot(0,0,'o','MarkerSize',15,'MarkerFaceColor','red')
hold on
grid on

%%%%%%%%%%%%%
% Atractive Potential -k/r %
%%%%%%%%%%%%%

for m = 1:length(epsilonA)
    for n = 1:length(theta)
        r(m,n) = alpha/(1 + epsilonA(m)*cos(pi/180*theta(n)));
        if r(m,n) <= 10 && r(m,n) > 0
            xA(m,n) = r(m,n)*cos(pi/180*theta(n));
            yA(m,n) = r(m,n)*sin(pi/180*theta(n));
        else
            xA(m,n) = NaN;
            yA(m,n) = NaN;
        end
    end
end

plot(xA',yA','o','LineWidth',1)
axis([-4 2 -3 3])
hold on

%%%%%%%%%%%%%
% Repulsive Potential k/r %
%%%%%%%%%%%%%

for m = 1:length(epsilonR)
    for n = 1:length(theta)
        r(m,n) = alpha/(-1 + epsilonR(m)*cos(pi/180*theta(n)));
        if r(m,n) <= 10 && r(m,n) > 0
            xR(m,n) = r(m,n)*cos(pi/180*theta(n));
            yR(m,n) = r(m,n)*sin(pi/180*theta(n));
        else
            xR(m,n) = NaN;
            yR(m,n) = NaN;
        end
    end
end
```

```
plot(xR',yR','x')
axis([-4 2 -3 3])

%%%%%%%%%%%%%
% Harmonic Potential k/2*r^2 %
%%%%%%%%%%%%%

for m = 1:length(epsilonH)
    for n = 1:length(theta)
        r(m,n) = sqrt(alpha/(1 + epsilonH(m)*cos(2*pi/180*theta(n))));
        if r(m,n) <= 10 && r(m,n) > 0
            xH(m,n) = r(m,n)*cos(pi/180*theta(n));
            yH(m,n) = r(m,n)*sin(pi/180*theta(n));
        else
            xH(m,n) = NaN;
            yH(m,n) = NaN;
        end
    end
end

plot(xH',yH','.')
axis([-4 2 -3 3])
```