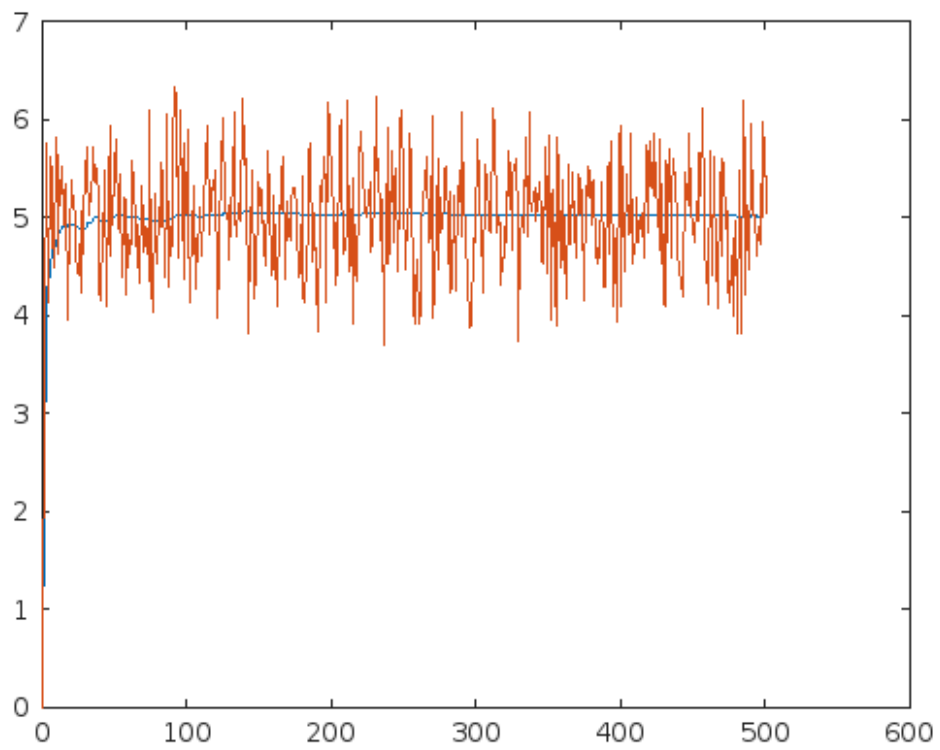

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% ARRAY OF MEASUREMENT %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%% Assume that the object is located at (3,4) %%%%%%%%%
%%%%%%%% Position of the object measured 500 times %%%%%%%%%
dataWithError = [];
for i=1:500
    % 3 + {-1 < number < 1} %
    if (rand > 0.5)
        x = 3 + rand;
    else
        x = 3 - rand;
    end

    % 4 + {-1 < number < 1} %
    if (rand > 0.5)
        y = 4 + rand;
    else
        y = 4 - rand;
    end

    % Distance to origin %
    dataWithError(end+1) = sqrt(x^2 + y^2);
end
%%%%%%%% FILL z OF KALMAN FILTER WITH DATA WITH ERROR %%%%%%%%%
for m = 1:length(dataWithError)
    z(:,m+1) = dataWithError(m);
end
%%%%%%%%% INITIALIZE VARIABLES OF KALMAN FILTER %%%%%%%%%%
H = 1;
F = 1;
G = 1;
u = 0;
N = length(dataWithError);
R = std(dataWithError);
I = 1;
Q = 0;
P = 1;
%%%%%%%%% RUN KALMAN FILTER ALGORITHM %%%%%%%%%%
x(:, 1) = 0;
for k = 2:N
    x(:, k) = F*x(:, k-1) + G*u;
    P = F*P*F' + Q;
    K = P*H' / (H*P*H' + R);
    x(:,k) = x(:,k) + K*(z(k) - H*x(:,k));
    P = (I - K*H)*P;
end
%%%%%%%%% RESULT %%%%%%%%%%
plot(x);
hold on
plot(z);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

```



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