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function [ ] = plotErr( Err,ErrE,P, s )

%PlotErr This function is to calculate and plot average errors
% This function is to calculate then plot the true estimation error
% for Kalman filter filtered data and extrapolated data
% Output arguments: NaN, only Graphs and visulaization
% Input arguments:
% Err      True estimation error matrix (over iterations)
% ErrE     Extrapolation True estimation error matrix (over iterations)
% P        Calculation error vector (standard deviation calculated from
%          covariance matrix
% s        String containing the variable name

[M,N]=size(Err);      %number of iterations and points
[~,NE]=size(ErrE);    %number of extrapolation error points
m=N-NE;              %extrapolation steps

ErrAvg=zeros(1,N-2);  %Average true estimation error
for j=1:N-2;
    ErrAvg(j)=sqrt((1/(M-1))*sum(Err(:,j+2)));
end
ErrAvgE=zeros(1,NE);  %Average extrapolation true estimation error
for j=1:NE;
    ErrAvgE(j)=sqrt((1/(M-1))*sum(ErrE(:,j)));
end

%plotting
plot(3:N,ErrAvg)
hold on
plot((m+1):N,ErrAvgE,'r')

plot(P,'color','m','linewidth',1.5)
title(sprintf('%s errors',s))
legend('filteration True Estimation error','Extrapolation True estimation
error','Standard deviation')
set(gcf,'position',[0,0,900,800]);

xlabel('points')
ylabel('value')
grid on
end

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