

```

load testmat_pratyush;

% Initial Guess

% state
x=randn(9,1);

% Covariance
P=eye(9);

% Process Noise covariance Q
Q=0.0007*eye(9);

% Measurement Noise covariance R
R=0.07*eye(3);

X=[]; Z=[]; Gain=[]; Err=[];

N=length(t);

% Construct H matrix
H=[zeros(3,6) eye(3)];

for n=1:N-1
    h=t(n+1)-t(n);
    h2=h^2/2;

    % Construct Phi matrix
    phi=[eye(3)      h*eye(3) h2*eye(3)
          zeros(3)   eye(3)   h*eye(3)
          zeros(3)   zeros(3)  eye(3)];

    % Compute the Kalman Gain K

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K=P*H'*inv(H*P*H'+R);

% Update the states

z=a(n,:)' ;

err=(z-H*x);

x=x+K*err;

% Update the P

P=(eye(9)-K*H)*P;

%Save the values

X=[X;x(:)'];

Z=[Z;z(:)'];

Gain=[Gain;K(:)'];

Err=[Err;err(:)'];

% Project Ahead

x=phi*x;

P=phi*P*phi'+Q;

end

ae=[X(:,7:9);a(end,:)];

subplot(311)

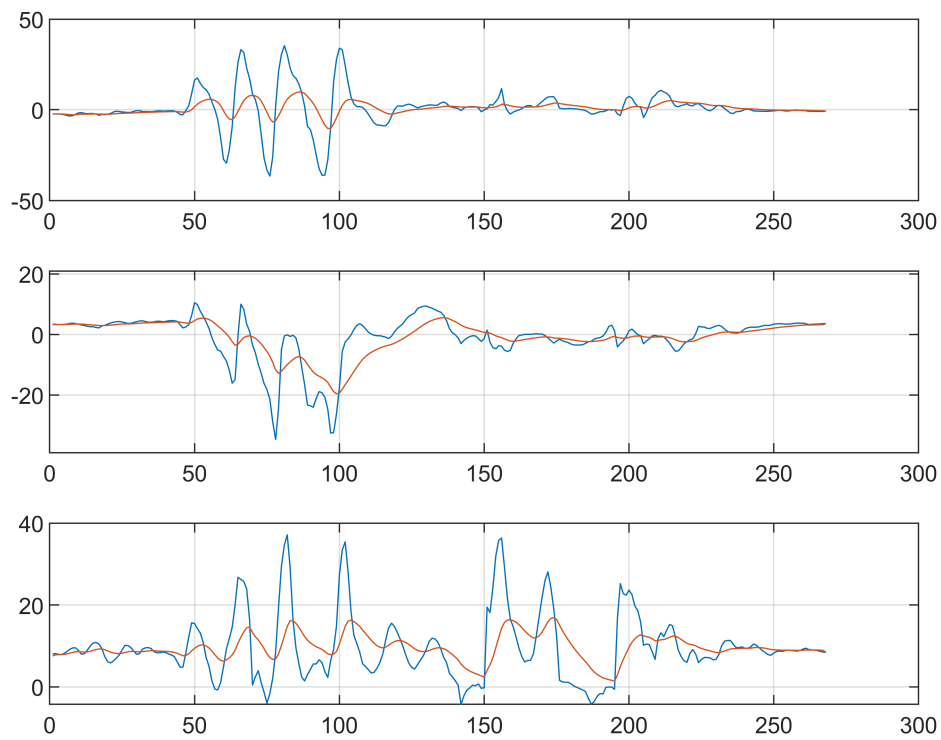
plot([a(:,1) ae(:,1)])

grid on

```

```
subplot(312)
plot([a(:,2) ae(:,2)])
grid on
```

```
subplot(313)
plot([a(:,3) ae(:,3)])
grid on
```



shg