

Collaborative Problem 4.1

Set up

Sensor noise: position = 1 mm, heading = 0.25 deg

```
V = diag([0.001 0.25*pi/180].^2);  
v = .5 %m/s
```

```
v = 0.5000
```

```
color = ['b','p'];
```

Create car

```
veh = Unicycle('covar',V);
```

Initial estimate of uncertainty

```
P0 = diag([0.002 0.002 0.4*pi/180].^2);
```

Create filter

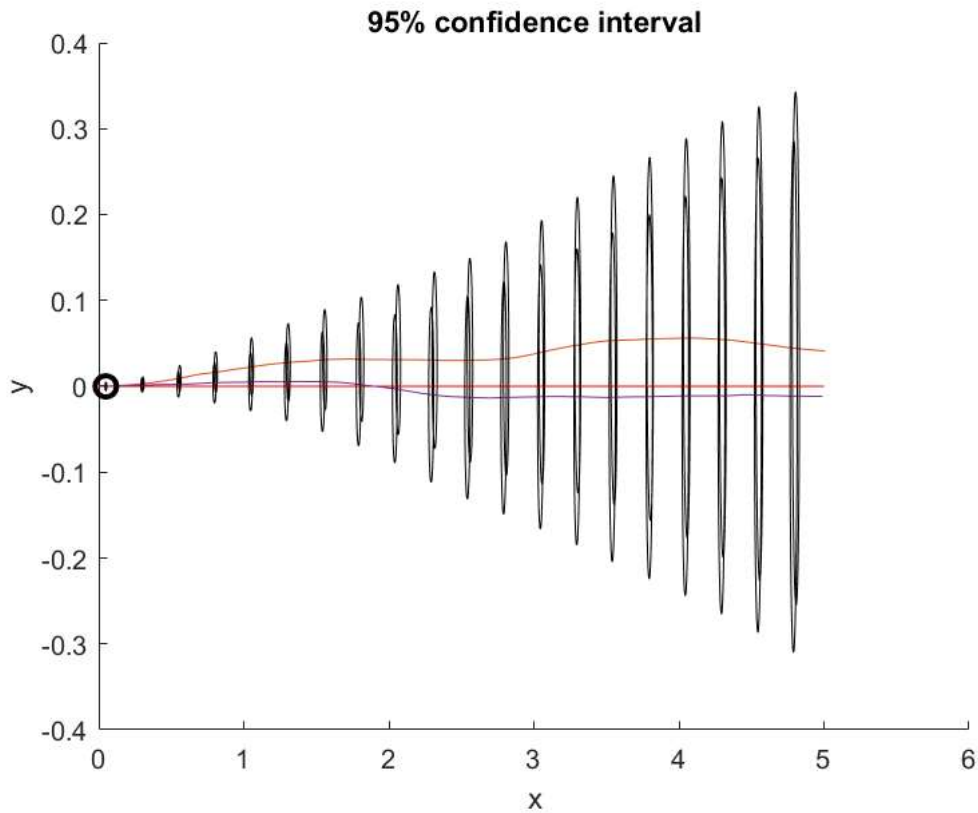
```
ekf = EKF2(veh, V, P0);
```

a) Simulate

```
count = 0;  
pose = [];  
for i=1:100  
    ekf.step_man(v,0);  
    count = count + 1;  
end  
%disp(count)
```

b) Plot

```
figure(1)  
hold on  
plot([0 5],[0 0],'r')  
ekf.plot_xy()  
xlabel('x')  
ylabel('y')  
title('trajectory')  
ekf.plot_ellipse()  
title('95% confidence interval')
```

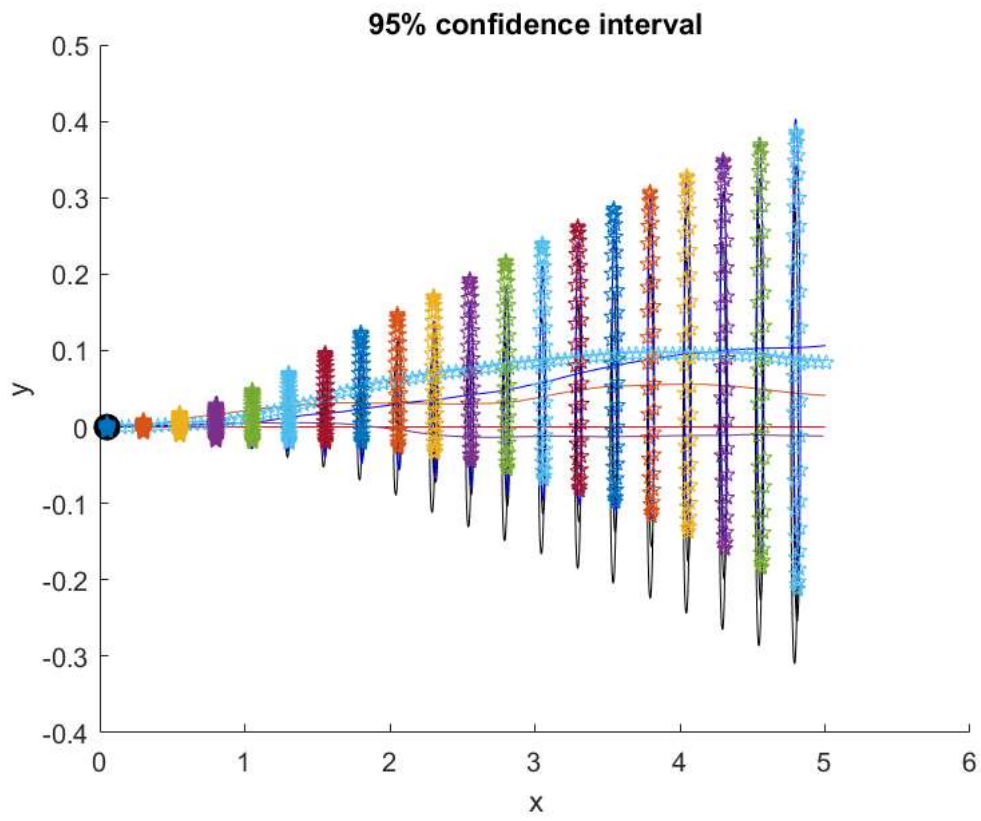


c) x confidence interval

```
h = ekf.history(end);
maxEst = h.x_est(1)+2*sqrt(h.P(1,1));
minEst = h.x_est(1)-2*sqrt(h.P(1,1));
```

d) Other seeds

```
for i=1:2
    rng(round(rem(now,1)*10^8));
    ekf = EKF2(veh,V,P0);
    for k=1:100
        ekf.step_man(v,0);
    end
    ekf.plot_xy(color(i))
    ekf.plot_ellipse(color(i))
end
```



e) Evaluation