

SSY191 - Sensor Fusion and Nonlinear Filtering

Peer-Review of Home Assignment 02

Lucas Rath

As a general hint, I think this might optimize your time generating figures. If you save the figures using the command line, they will look more beautiful and by just running the script you generate and save all the figures in one shot. Try this code here below as an example. Actually, I have developed a function that does everything for me, so after creating the figure I just call `savefig(figurehandle, 'FIGNAME')`, which creates the folder if it does not exist, removes the white frame and saves the figure.

```
% add in the beginning of your main.m
% it will create a folder 'images' in your current folder
foldername = fullfile(pwd, 'images');
if ~ exist(foldername, 'dir'), mkdir(foldername); end

fig = figure('Color', 'white', 'Position', [586 360 505 359]);
% code to plot the figures

% remove the annoying white space around the figure (save space to display in latex)
set(fig.CurrentAxes, 'LooseInset', fig.CurrentAxes.TightInset)
% save figure to folder 'images' in the format eps
saveas(fig, fullfile(foldername, 'NAMEOFFIGURE'), 'eps')
```

Scenario 1 A first Kalman filter and its properties

- A)** Concise answer, nothing to add.
- B)** In this item I would just have added labels to axis in the posterior plots and comment a bit more about these plots. From my point of view, this posterior distribution $p(x_k|y_{1:k})$ represents the probability of the true state being in a certain range and we can verify that this is the case in the figures.
- C)** Nice analysis about what happens with the variance and mean of the distributions after the prediction and update step. I think it would be nice also if you have plotted the true state to see that the posterior is a reasonable good distribution.
- D)** Nice plots and analysis. I would just conclude that the designed Kalman filter is consistent.
- F)** Nice plots and explanation. I know it was not asked in the question but you could also have plotted the 3-sigma curves to see that they also converge to the same lines.

Scenario 2 Kalman filter and its tuning

- A)** I think the main point of this question was to state that in the position plot, the position derivative (velocity) seems to be constant or at least piece-wise constant for all the time, which is reasonable given that we have used a CV model.

B) Very nice explanation about how the covariance of the position and velocity changes over time. I haven't thought about this before.

C) Nice explanation and analysis.