

Probabilistic Robotics  
PRRO6, Fall 2017  
Book Assignment 4.6.1  
Assigned: Tuesday September 12;  
Due: Tuesday September 19, 13:00 in the afternoon

September 28, 2017

In this exercise, you will be asked to implement a histogram filter for a linear dynamical system studied in the previous chapter.

- (a) Implement a histogram filter for the dynamical system described in Exercise 1 of the previous chapter (Exercise 3.8.1 at page 81). Use the filter to predict a sequence of posterior distributions for  $t = 1, 2, \dots, 5$ . For each value of  $t$ , plot the joint posterior over  $x$  and  $\dot{x}$  into a diagram, where  $x$  is the horizontal and  $\dot{x}$  is the vertical axis.
- (b) Now implement the measurement update step into your histogram filter, as described in Exercise 2 of the previous chapter (Exercise 3.8.1 at page 82). Suppose at time  $t = 5$ , we observe a measurement  $z = 5$ . State and plot the posterior before and after updating the histogram filter.

## Hand-In

When you have completed the assignment, upload your solution to Blackboard, together with your solution of Assignment 4.6.4. This should be a PDF, with your Matlab scripts as pseudo-code (for example with the matlab-prettifier package). If you have only partially solved the assignment, upload your partial solution.