* Extra homework 11

You should return via mycourses by **Thursday, December 21 at 12:00**.

Please notice that you can get full homework points by doing the homeworks 1–10 only, but you can get maximum 4 extra points from this one.

Homework 11 (DL Thursday, December 21 at 12:00)

Consider the following 1D non-linear model

$$\begin{aligned}
x_k &= x_{k-1} - 0.01\sin(x_{k-1}) + q_{k-1}, \\
y_k &= 0.5\sin(2x_k) + r_k,
\end{aligned} \tag{1}$$

where q_{k-1} has variance 0.01^2 and r_k has variance 0.02.

(a) Simulate 100 steps of states and measurements from the model. Plot the data.

(b) Implement and run a particle filter on the model. Plot the results and compute the RMSE of the particle filter when the estimated state mean is used as the estimator.

Please submit your solution through the return box in the course web-page.