* Extra homework 11

You should return via mycourses by **Friday, December 16 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 Friday, December 16 at 12:00)

Consider the following 1D non-linear model

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

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.