Exercise Round 9

The deadline of this exercise round is **Thursday March 20, 2025**. The solutions will be discussed during the exercise session in the T2 lecture hall of Computer Science building starting at 14:15.

The problems should be *solved before the exercise session*. During the session those who have completed the exercises will be asked to present their solutions on the board/screen.

Exercise 1. (RTS Smoother with Non-Zero Mean Noises)

Derive the linear RTS smoother for the non-zero-mean noise model in Exercise 1 of Round 3.

Exercise 2. (Smoother for Gaussian Random Walk)

Implement the Gaussian random walk model smoother in Example 12.3 (in the book) and compare its performance to the corresponding Kalman filter. Plot the evolution of the mean and covariance of the smoothing distribution and compare them to the mean and covariance of the Kalman filter.

Exercise 3. (Smoother for Stochastic Resonator)

(a) Implement the RTS smoother for the resonator model in Exercise 3 on Round 3.

(b) Compare its RMSE performance to the filtering and baseline solutions and plot the results.