# Laboratory #4:
# design of Kalman predictors and filters for a LTI dynamic system

## Introduction to the first part (03/05/2021 videotape on Teaching Portal: 0:00 – 14:30): problem setup and LTI dynamic system simulation

**First part (with your PC and MATLAB R2014a, 30 minutes):**

- Definition of the LTI dynamic system S
- Definition of the noise variances
- Set-up of the initial state of the LTI dynamic system S
- Simulation of the LTI dynamic system S loading the input u from the file data.mat
- Plot of the states and output of the LTI dynamic system S

## Comments on the first part (videotape: 15:30 – 20:00)

## Introduction to the second part (videotape: 20:00 – 26:00): design of dynamic predictor and filter in standard form

**Second part (with your PC and MATLAB R2014a, 45 minutes):**

- Initialization of the dynamic predictor K
- Simulation of the dynamic predictor K and the dynamic filter F
- Computation of the RMSEs for the dynamic predictor K and the dynamic filter F
- Plot of the estimated states and output versus the actual ones

## Comments on the second part (videotape: 27:30 – 42:30)

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## Introduction to the third part (03/05/2021 videotape on Teaching Portal: 42:30 – 49:30): design of steady-state predictor and filter in standard form

**Third part (with your PC and MATLAB R2014a, 30 minutes):**

- Initialization of the steady-state predictor Kinf
- Off-line computation of steady-state Kalman gain matrices
- Simulation of the steady-state predictor Kinf and the steady-state filter Finf
- Computation of the RMSEs for the steady-state predictor Kinf and the filter Finf
- Plot of the estimated states and output versus the actual ones

## Comments on the third part (videotape: 49:30 – 01:05:00)