

## Experimental Modeling – Laboratory #2

### System identification using the statistical and the Set Membership approaches

1. Click on Matlab 6.1; if this link is not directly available on the desktop, it can be found in the folder:  
Server(\\ladiserver1)(S:)\MatlabR12p1\MATLAB6.1
2. To begin to use the System Identification toolbox, type:  
**iddemo**  
and then select the demo number 1  
(at home, you can guess also the demo numbers 2 and 3)
3. Change the working directory to:  
S:\SMID\_ExpModel\ES2
4. To begin to use the Set Membership Identification toolbox, type:  
**smid**  
(for a theoretical introduction to this part, see 01/12/2020 videotape on Teaching Portal, from 1:22:00 to 1:45:30)
5. In the “ident” window, click on “Data” and then on “Import...”
6. In the “Import Data” window, click on “Open...”,  
then “Data file”,  
then “LjungData”,  
then click on “Import” and on “Close”
7. In the “ident” window, click on “Estimate ->”,  
then guess “Parametric models” using ARX, ARMAX, OE or State Space models of different orders  
(in the “ident” window, click on “Model output” for comparison)
8. In the “ident” window, click on “Estimate ->”,  
then click on “SM Identification”
9. In the “SMID: Prior Validation” window,  
click on “Optimal Model Set Computation”
10. In the “SMID: Optimal Model Set Computation” window,  
click on “Load a computed value set” and then choose “LjungVS”,  
then click on “Value set polar plot” and  
then click on “Value set frequency plot”
11. In the “SMID: Optimal Model Set Computation” window,  
click on “Reduced-order Model Set Computation”
12. In the “SMID: Reduced-order Model Set Computation” window,  
click on “Choose a model...” and use FIR or Reduced-order models of different orders  
(in the “ident” window, click on “Model set freq resp” for comparison)