

# ID3

## ARX Identification



### QUESTIONS

- Q.3.1** – How can we partition an ARX model? Are its parts independent?
- Q.3.2** – Can optimal ARX predictors be affected by stability problems? Explain your reply.
- Q.3.3** – An ARX predictor is constructed with the exact parameters of the ARX process that has generated a given sequence of data. Characterize its prediction error.
- Q.3.4** – Describe under which conditions an input sequence is suitable for identifying an order  $n$  MISO ARX process. Give examples of optimal input sequences.
- Q.3.5** – How can we compare the suitability of different input sequences for identification purposes?
- Q.3.6** – Describe the characteristics of least squares estimates for ARX processes.
- Q.3.7** – Describe possible reasons for applying recursive least squares in the identification of ARX processes.
- Q.3.8** – Describe possible reasons for applying weighted least squares in the identification of ARX processes.
- Q.3.9** – Describe possible reasons for applying Kalman filtering in the identification of ARX processes.
- Q.3.10** – Compare weighted least squares and Kalman filtering in the identification of time dependent processes.
- Q.3.11** – Describe the influence of input sequences and of the variance of equation errors on the covariance of least squares estimates of ARX processes.

- Q.3.12** – Describe the asymptotic distribution of least squares estimates of the parameters of ARX models.
- Q.3.13** – Compare the covariance of least squares with that of other unbiased estimators in ARX identification.
- Q.3.14** – Describe which criteria can be used to estimate the order of MISO ARX processes.
- Q.3.15** – What are the advantages of using minimal parameterizations in ARX identification?
- Q.3.16** – Describe possible validation techniques for ARX models.
- Q.3.17** – What is the structure of multivariable models? Which link exists between order and structure in multivariable models?
- Q.3.18** – Define the structural identification of multivariable ARX models.
- Q.3.19** – Explain which tools can be used to obtain state space descriptions for ARX models.
- Q.3.20** – Describe MISO and MIMO state space ARX models.

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