

LESSON 21 - ADVANCED TOPICS IN SYSTEM ID

OBJECTIVES: SURVEY FIELD FOR ADVANCED TOPICS

→ SUBSPACE REALIZATION:

- DETERMINISTIC SYSTEMS:

MOESP - Multivariable Output Error State-Space

N4SID - Numerical Algorithms for Subspace State-Space
System Identification

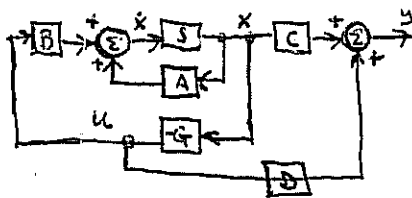
ch. 6 in Text

- Stochastic Systems:

Markov Models

ch. 7 & 8 in Text

- Feedback in state-space:



$$u = -Gx$$

- Joint input/output approach.

Chapter 11 in Text.

- Adaptive filtering and adaptive control

- On-line identification

- Time-varying systems

(Åström & Wittenmark, "Adaptive Control", 1995)

- Non-Linear System ID:

• NARMAX

↳ Non-linear Auto-regressive models.

- Least-squares fit of parameters for non-linear basis functions.

• Optimization and Search Algorithms
(Nelles, "Nonlinear System ID" 2001)

→ Multirate and irregularly sampled systems

→ Doi, "Multirate System Identification" 1996

→ Yesildirek, "Multirate System Identification and Adaption Control" 1992

→ Related Advanced Topics:

- Search Algorithms
- 2D Fourier Analysis
- Wavelet Transform
- Pattern Classification and AI