

Introduction: IDENTIFICATION OF DYNAMICAL SYSTEMS

- SYSTEM THEORY: Highly interdisciplinary area of the study of self-regulating systems

* Key ideas:

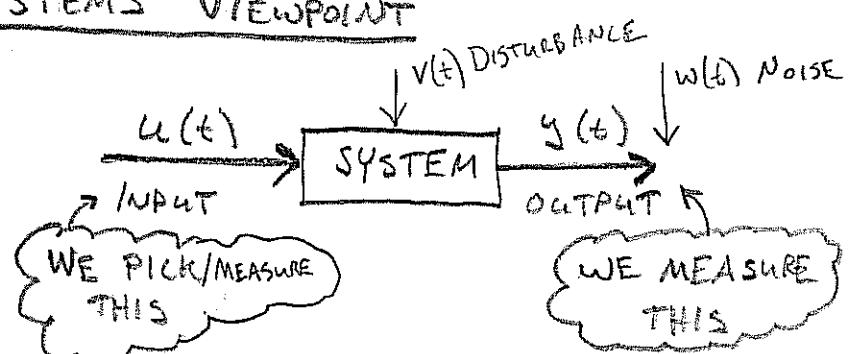
- Controllable inputs
- Measurable outputs
- Feedback

• Application Areas:

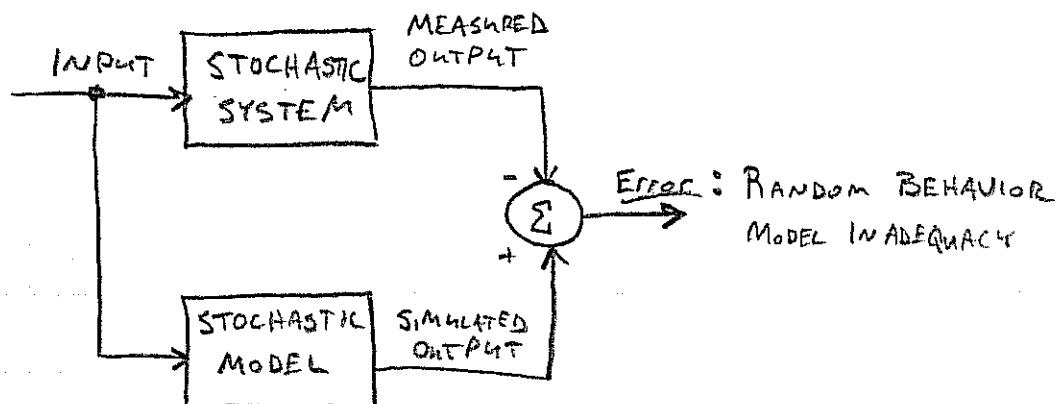
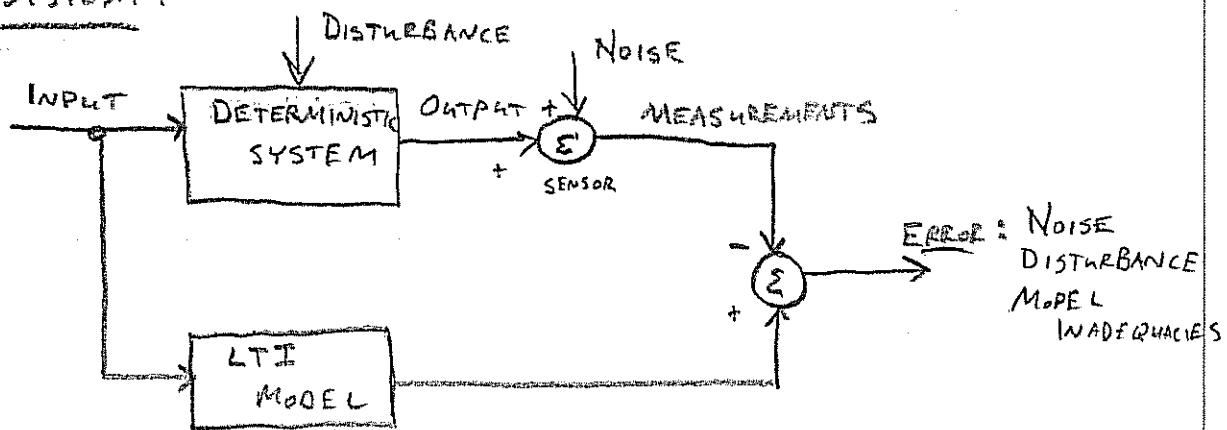
- ECONOMICS
- SOCIOLOGY
- BIOLOGICAL SYSTEMS
- POPULATION DYNAMICS
- ENGINEERING
 - MECHANICAL/ELECTRICAL CONTROL
 - VIBRATIONS
 - CHEMICAL PROCESSES
 - FLUID FLOW
 - COMMUNICATIONS
 - SIGNAL PROCESSING

→ The application areas are incredibly diverse, but they all share a common mathematical framework.

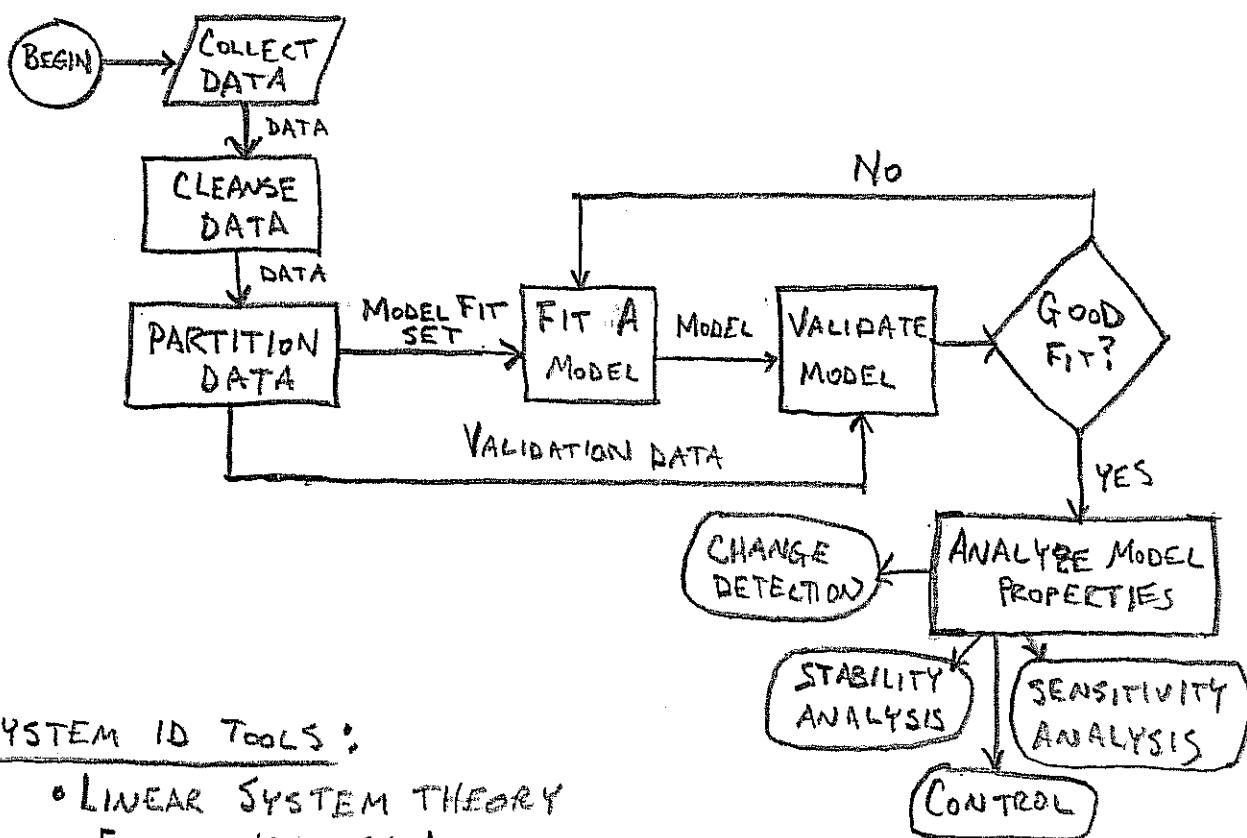
SYSTEMS VIEWPOINT



- IN SYSTEM ID WE TRY TO DISCOVER THE SYSTEM DYNAMICS (MODEL).

STOCHASTIC SYSTEMSYS ID SYSTEM:

* WE WILL FOCUS ON DETERMINISTIC MODELS
WITH RANDOM DISTURBANCES AND NOISE.

SYSTEM ID PROCESS:SYSTEM ID TOOLS:

- LINEAR SYSTEM THEORY
- FOURIER/COMPLEX ANALYSIS
- SAMPLING THEORY
- PROJECTION
- MODELS:
 - TRANSFER FUNCTIONS
 - STATE-SPACE

* WE WILL BUILD THE FOUNDATIONS OVER THE FIRST HALF OF THE CLASS

* THESE TOOLS WILL ALSO ALLOW US TO ANALYZE AND UNDERSTAND THE MODELS THAT WE BUILD.

- MatLab Review Session?