

Engineering System Identification (Spring, 2010)

http://www.colorado.edu/engineering/CAS/courses.d/SYSID.d/SYSID_2010.html

When: Monday 10:00-11:50 & Wednesday 10:00-10:50

Where: Room OSE 309

Instructors: K. C. Park (k.c.park@kaist.ac.kr)

Y. J. Park (yjpark@kaist.ac.kr)

Lecture Notes: To be posted on class website

Supplementary Texts: J. Juang: Applied System Identification;

G. Strang: Wavelets and Filter Banks;

A. Hyvärinen, J. Karhunen, E. Oja: Independent Component Analysis;

N. E. Huang, S. S. P. Shen: Hilbert-Huang transform and its applications

Grading: Homework(30%), Mid-Term Exam and Final (60%), Participation (10%)

Synopsis

This course covers modern methods for identifying system parameters and/or physical models from the measured input and output data. It focuses on system theory-based identification techniques, which yields a unique maximum-order realization for noise-free data. Applications involve the second-order vibratory systems, and if necessary will cover parabolic systems as well.

Outline

Elements of System Identification: Measurement Systems, Identification Process

Identification Models: Time-Domain Models, Frequency-Domain Models

Fourier and Wavelet Transforms and Tutorials on FFT and Wavelets

Data Processing of Measurement Data: Sampling/Windowing, Signal Conditioning

Data Acquisition and Noisy Data: Filtering, Sensor/Actuator Placements

System Identification Theory: System Realization Theory, ERA

System Identification Practice: Applications to dynamical systems

Tutorials on System Identification Research Software: Realization examples

Recent Developments: Huang-Hilbert Transform, Independent Component Analysis