IT6303
Advances in
Digital Signal Processing

Dept. of Computer Eng. & Information Technology
City University of Hong Kong

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Objectives

- Study selected topics in advanced digital signal processing (DSP), including theories and applications
- Get hands-on DSP experience via MATLAB exercises
- Stimulate critical and creative thinking via discussions

Expectation

- Understand the studied DSP topics
- Know basic DSP simulation/programming techniques
- Know how to read research papers

Syllabus

- Review of DSP and Random Processes
- Simulation Techniques via MATLAB
  - Signal Generation, Digital Filtering
- Optimal Filter Theory & Applications
  - Least Squares Filters, Wiener Filters, Examples
- Adaptive Filter Theory & Applications
  - Least Mean Square (LMS) Algorithm, Recursive Least Squares Algorithm, Examples
- Estimation Theory & Applications
  - Performance Measures, Methods, Examples

Teaching Pattern

- Lecture
- Tutorial
- Laboratory
- Discussion

Proposed Assessment

- Assignment : 12%
- Laboratory : 51%
- Open-Book Test : 22%
- Research Paper Review: 15%

Proposed Schedule

	Lecture/Discussion/Tutorial	Test	Laboratory
Week	B5118	B5118	G2320
1	18:30-21:20		
2	18:30-21:20		
3			18:30-21:20
4	18:30-21:20		
5	18:30-21:20		
6	18:30-21:20		
7			18:30-21:20
8	18:30-21:20		
9	18:30-21:20		
10			18:30-21:20
11	18:30-21:20		
12	18:30-21:20		
13		18:30-21:20	

Guidelines for the Research Paper Review:

- About the research paper:
  - research papers are mainly divided into two categories: journals and conferences
  - you should select a ***journal*** paper in the area of ***signal processing***
  - The journals related to signal processing include
    - *IEEE Transactions on Signal Processing*
    - *IEEE Transactions on Speech and Audio Processing*
    - *IEEE Transactions on Image Processing*
    - *IEEE Transactions on Circuits & Systems - Part II*
    - *IEEE Transactions on Multimedia*
    - *IEEE Transactions on Communications*
    - *IEE Proceedings - Vision, Image and Signal Processing*
    - *IEE Proceedings - Radar, Sonar and Navigation*
    - *Digital Signal Processing*

- *Signal Processing*
- *Signal Processing: Speech Communications*
- *Signal Processing: Image Communication*

- electronic versions can be found at

  http://www.cityu.edu.hk/lib/eres/index.htm

- selected papers should be ***recently published*** (≥1998)
- selected papers should not be too short (e.g. ≥4 pages for 2-column papers)
- you should select a paper and get approval by ***Week 6***
- each student should give a review report for a different paper

- Assessment of review report:
  - clearness and correctness of the presentation

- a ***review*** of the paper should include
  - background and/or motivation of the reviewed paper
  - advantages/weaknesses and disadvantages/strengths of the reviewed paper
  - other potential applications derived from the reviewed paper?
  - new research ideas derived from the reviewed paper?
  - if possible, justification of your critical review (e.g., computer simulation results)
- should be submitted on or before ***Week 13***