



EE3660 數位訊號處理概論

課程介紹

Chao-Tsung Huang

**National Tsing Hua University
Department of Electrical Engineering**

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天時、地利、人和

- Class Hours: W5W6R8
- Lecture Room: 台達 217
- Instructor: 黃朝宗
- TA: 許秀斌、翁笠群、林念慧、吳佩錡、陳永泰



課程主旨

- 了解現實世界的類比訊號與電腦計算的數位訊號之間的轉換關係
- 熟習基礎的數位訊號處理技巧
 - Discrete Fourier Transform (DFT)
 - Finite Impulse Response (FIR) Filter
- 初探進階處理技巧
 - Multirate Signal Processing
 - Random Signal Processing



授課內容與方式

- 本課程大致上分為三個單元：
 - 類比數位轉換：訊號與系統之複習(Chap2-6)
 - 基礎數位訊號處理：課程核心，深入介紹數位訊號處理的基礎技術(Chap7-10)
 - 進階數位訊號處理：介紹實用的進階處理技術(Chap12-14)
- 主要授課時間為W5W6，R8將以介紹實際應用為主，以期讓同學對數學模型與真實應用之間的連結有所認知；授課方式以投影片說明為主。



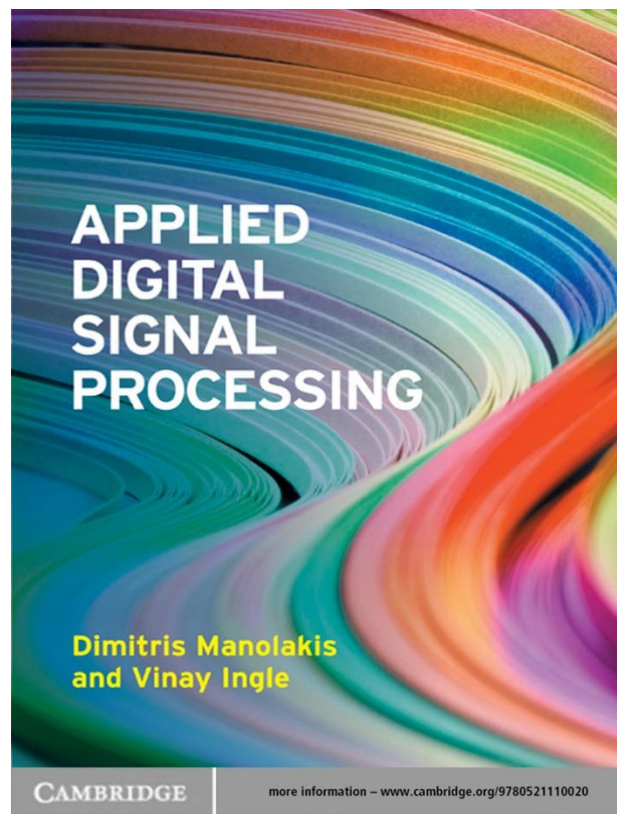
修課條件

- 必需修過訊號與系統、計算機程式設計、線性代線
- 建議修過機率



課程用書

- D. G. Manolakis and V. K. Ingle, “Applied Digital Signal Processing,” 1st ed., Cambridge University Press, 2011.
 - 上課吸收觀念
 - 自修練習細節





成績評量

- Homework (55%)
 - 共有六次作業，會在相對的章節上課前就給出
 - 繳交方式
 - 手寫作業: deadline當天課堂上繳交
 - MATLAB作業: deadline前於iLMS上繳交
 - 手寫比例會逐漸減少，程式作業(MATLAB)逐漸提高
 - R8會有各次作業講解與MATLAB tutorial
- Midterm (20%)
 - A4小抄、CH2-6與(重點)CH7, 10
- Project (25%)
 - 讓同學自由發揮的小程式



課程行事曆

Week	Date	W5W6	Date	R8	HW out	HW due
1	3/4	Overview: Syllabus and introduction	3/5	Ch2: Discrete-time signals and systems	1	
2	3/11	Ch3: The z-transform	3/12	MATLAB tutorial - Basics/DSP	2	
3	3/18	Ch4: Fourier representation	3/19	Ch5: Transform analysis of LTI systems		
4	3/25	Ch5: Transform analysis of LTI systems	3/26	Ch6: Sampling of continuous-time signals	3	1, 2
5	4/1	Ch6: Sampling of continuous-time signals/Ch7	4/2	No class (清明連假)		
6	4/8	Ch7: Discrete Fourier transform	4/9	Example: Digital camera; HW1/2 Answer	4	3
7	4/15	Ch7: Discrete Fourier transform/Ch10	4/16	Ch10: Design of FIR filters; HW3 Answer	5	
8	4/22	Ch10: Design of FIR filters	4/23	No class (midterm複習)		4
9	4/29	Midterm	4/30	Project announcement ; Mid Answer		
10	5/6	No class (ICASSP)	5/7	No class (ICASSP)		5
11	5/13	Ch8: Computation of DFT (FFT)	5/14	Example: Uncertainty principle; black-hole image	6	
12	5/20	Ch9: Structures for discrete-time systems	5/21	Example: DSP computing		
13	5/27	Ch12: Multirate signal processing	5/28	Example: Image deblurring; Image refocusing Project proposal		
14	6/3	Ch12: Multirate signal processing	6/4	Example: Video magnification		6
15	6/10	Quick view of Ch13/14: Random signals	6/11	Example: JPEG compression		
16	6/17	No class (Project consultation)	6/18	No class (Project consultation)		
17	6/24	Project report due				

第一單元：W1-5

第二單元：W6-12

第三單元：W13-15

HW1: Chap2, 3, 4 (paper)

HW2: Chap2, 3, 4 (MATLAB)

HW3: Chap5, 6 (paper and MATLAB)

HW4: Chap7 (paper and MATLAB)

HW5: Chap10 (paper and MATLAB)

HW6: Chap8, 9 (MATLAB)



課程網頁

- iLMS website
 - <http://lms.nthu.edu.tw/course/43597>
 - 程式作業與期末專題皆繳交於此