IEE6533: Information Theory 消息理論 (Sept. 2009)

Time: 3:30pm – 5:20pm (Monday) ED301; 11:am – 12:00 (Tuesday) ED022

Instructor: 杭學鳴 (Hsueh-Ming Hang), ED609, x31861
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Office hours: 1:30pm – 3:30pm Tuesday. **Please make an appointment in advance (請儘可能事先預約時段)**

Teaching Assistant: 蔡家揚 (ED529, x54228) chyatsai@gmail.com

Objectives: In this course, we will discuss two most fundamental problems in communication systems, namely, minimum data representation and reliable communication. The focus is the well-known Shannon's three theorems: source coding, channel coding and rate distortion theorems.

Class notes: 杭學鳴 http://cwww.ee.nctu.edu.tw/course

Textbook: T.M. Cover and J.A. Thomas, *Elements of Information Theory*, 2nd ed., Wiley 2006.

Recommended Readings:

1. R. W. Yueng (楊偉豪, 香港中文大學), *Information Theory and Network Coding*, Springer, 2008.
2. R.G. Gallager, *Principles of Digital Communications*, Cambridge, 2008.
3. R.G. Gallager, *Information Theory and Reliable Communications*, Wiley, 1968.
4. R.E. Blahut, *Principles and Practices of Information Theory*, Addison Wesley, 1987.

Grading: Homework: 15%; Computer-project: 20%
Midterm Examine: 30% (2 hours, open book)
Final Examine: 35% (2 hours, open book)

Background: Signals and Systems, Probability (and Statistics), Principles of Communication Systems, (Stochastic Processes)

Contents:

(1) Introduction
(2) Information and Entropy
(3) Source Coding Theorem
(4) Channel Capacity and Channel Coding Theorem
(5) Rate Distortion Theory
(6) Continuous Source, Differential Entropy and Gaussian Channel
(7) Continuous-amplitude Rate-distortion Theory