

EE 376A/Stat 376A
Information Theory
TTh 11-12:15pm, 380-380c

Handout #3
Tuesday, January 6, 2009
T. Cover

Reference Books

Primary text:

- Cover and Thomas, *Elements of Information Theory*, Second Edition, Wiley, 2006. Course text.

Collections:

- *Claude Elwood Shannon: Collected Papers*, IEEE Press, 1993. Everything Shannon published including some internal Bell Labs memoranda as well.
- *Information Theory: 50 Years of Discovery*, Verdu and McLaughlin eds., IEEE Press, 1999. (Reprint of *IEEE Transactions on Information Theory*, October 1998 Commemorative Issue.) Characterization of the frontier of information theory on the fiftieth anniversary of the field.

Other recommended references:

- Gallager, *Information Theory and Reliable Communication*, Wiley, 1968. A benchmark text and research reference.
- Csiszar and Korner, *Information Theory*, 1981. An important research reference from a unique point of view. Develops the method of types.
- Slepian, *Key Papers in the Development of Information Theory*, IEEE Press, 1974. A collection of original papers for both historians and researchers. Contains Shannon's papers.
- Chuang and Nielsen, *Quantum Computation and Quantum Information*. An important basic text on quantum information.

- Pinsker, *Information and Information Stability of Random Variables and Processes*, Holden-Day, 1964. One of the first and most influential.
- Yeung, R.W., *A First Course in Information Theory*, Kluwer, 2002.
- Blahut, R., *Principles and Practice of Information Theory*, Addison Wesley, 1987.
- Han, Te Sun, *Information-Spectrum Methods in Information Theory*, Springer, 2003.
- MacKay, *Information Theory, Inference, and Learning Algorithms*, Cambridge, 2003.
- Blahut, *Principles and Practice of Information Theory*. A good text.
- McEliece, *The Theory of Information and Coding*. Readable and to the point. Emphasizes duality of channel capacity and rate distortion.
- Li and Vitányi, *An Introduction to Kolmogorov Complexity and its Applications*, Springer, 1993. The best reference on algorithmic complexity to date.
- Golomb, Peile and Scholtz, *Basic Concepts in Information and Coding: The Adventures of Secret Agent 00111*. A textbook on the subject.
- Ash, *Information Theory*. Concise. Well written.
- Abramson, *Information Theory and Coding*. Simple and intuitive. Good for the first part of the course.
- Berger, *Rate Distortion Theory*. A classic on the mathematics of data compression.
- Berlekamp, *Algebraic Coding Theory*. An important book in coding theory and algebra. Covered in EE387.
- Brillouin, *Science and Information Theory*. The role of information theory in physics. Maxwell's demon.
- Fano, *Transmission of Information*. A precursor to Gallager.
- Forney, *Information Theory*, unpublished course notes. A nice early treatment.
- Gray, *Entropy and Information Theory*. A research monograph.
- Gray, *Source Coding Theory*.
- Gray and Davisson, *Ergodic and Information Theory*. Collected papers.
- Hamming, *Coding and Information Theory*. Text based on Abramson's approach.
- Ihara, *Information Theory for Continuous Systems*, World Scientific, 1993. Has material on Gaussian channel with feedback.

- Jelinek, *Probabilistic Information Theory*. Early text. Some material not found elsewhere.
- Khinchin, *Mathematical Foundations of Information Theory*. Translated from the 1957 Russian edition.
- Kotel'nikov, *The Theory of Optimum Noise Immunity*. Russian translation of one of the original efforts in the area.
- Reza, *An Introduction to Information Theory*. Intermediate level — between Abramson and Gallager.
- Shannon and Weaver, *The Mathematical Theory of Communication*, 1948. The original book. Still very intuitive and interesting. The main body of this is reprinted in Slepian's *Key Papers in the Development of Information Theory* and can be found in Shannon's *Collected Works*.
- Szpankowski, *Average Case Analysis of Algorithms on Sequences*, Wiley, 2001. Detailed bounds on combinatorics arising in information theory.
- Viterbi and Omura, *Principles of Digital Communication and Coding*. Thorough study of information theory and its relevance to digital communication.
- Wells, *Applied Coding and Information Theory for Engineers*, Prentice Hall, 1999. Textbook.
- Wolfowitz, *Coding Theorems of Information Theory*, 1961. An early mathematical treatment of information theory. Concise.
- Yaglom and Yaglom, *Information Theory*. Translation of the principal Russian text on information theory. Contains a chapter on the entropy of language.
- A. El Gamal and Y.-H. Kim, *Lecture Notes on Network Information Theory (LNIT)*
<http://circuit.ucsd.edu/~yghk/lnit.html>