

ECE 563: Information Theory

Fall 2004

What is Information Theory?

- A subset of communication theory
 - reliable communication of information
- A subset of theoretical computer science
 - complexity theory, minimum length descriptions
- A subset of physics
 - thermodynamics and statistical mechanics

Information Theory is also about

- Mathematics
 - ergodic theory, probability theory and statistics
- Philosophy of science
 - Occam's razor
- Economics
 - investment and portfolios
 - *A Mathematician plays the stock market*, J. A. Paulos.

What is ECE 563 about then?

Information theory as a subset of communication theory

- a **measure** of information
 - bits
- how to communicate information reliably over a **channel**
 - workhorses of the information age: modems, cell phones.
- how to **compress** information
 - gzip

Details

- Text book: [Elements of Information Theory](#) by Cover and Thomas, Wiley Publications.
- Course Webpage: <http://courses.ece.uiuc.edu/ece563/fall104/>
 - [Weekly](#) homeworks: 70%
 - Take home final: 30%
- Teaching Assistant: Zhijun Zhao (Office hours TBD)

The Beginning

- Information theory began with a paper by Claude Shannon:

A Mathematical Theory of Communication,

Bell Systems Technical Journal, July-October 1948.

- Reading material for the first lecture:
first 6 sections of part I.