

Syllabus for EE 477, Fall 2011: Universal Schemes in Information Theory

- Introduction and overview
- Lossless compression:
 - Fundamentals
 - Lempel-Ziv (LZ) compression
 - Context Tree Weighting
- Discrete Denoising:
 - Bayes-optimal schemes and performance limits
 - Universal schemes: construction and performance analysis
 - Lower bounds
- Lossy compression:
 - Rate distortion theory for stationary sources
 - Universal schemes: LZ-based codes, iterative approaches
- Compression-based denoising:
 - Indirect rate distortion theory
 - Denoising via lossy, and lossless, compression
- Sequential decision making (prediction, filtering, learning) via compression
- Communication under channel uncertainty
- Applications in genomics and proteomics
- Selected topics according to student interest and remaining time