Data Sciences Summer Institute  
May 24 – July 2, 2010  
University of Illinois at Urbana-Champaign  
The Mathematics, Algorithms and Tools for Data Analytics

Core Course: Foundations of Data Sciences

Course Topics:


Statistics – Hypothesis testing, Analysis of Variance, Maximum Likelihood Estimators, Bayes’ Estimators, Regression.

Entropy, Mutual Information, KL divergence.

Decision Trees.

Optimization – Linear Programming, Least Mean Squares, Steepest Descent, Lagrange multipliers.

Clustering – Gaussian Mixture Models, k-Means.

Data Reduction – Singular Value Decomposition, Principle Component Analysis, Wavelets.

Hidden Markov Models.