

Bocconi University
PhD in Statistics & Computer Science

40036 STATISTICAL THEORY I
Instructors: Zoraida Rico and Botond Szabo

Lecture 1: Brief introduction to statistical inference, standard estimators, asymptotic normality of the MLE

Lectures 2-3: Bayesian paradigm, Bernstein von-Mises theorem: asymptotic normality of the posterior distribution in regularity parametric models

Lecture 4: Optimality guarantees for estimation in parametric models

Lecture 5-6: Hypothesis testing (basic concepts, multiple testing, model selection methods, optimality guarantees)

Lecture 7: concentration inequalities (Markov, Chebyshev, CLT, Hoeffding, Chernoff, Bernstein,...etc)

Lecture 8: Shrinkage (Stein's phenomena, James-Stein estimator)

Lecture 9-10: High-dimensional models (linear, logistic, generalized linear regression, graphical models, matrix completion, PCA) and regularization methods (LASSO, ridge, elastic nets, Bayesian methods: spike-and-slab prior and global-local shrinkage priors)