STAT 447B – METHODS FOR STATISTICAL LEARNING

2014/2015

Description: Modern statistical methods, including predictive models (linear and otherwise), variable and model selection methods, non-parametric regression (kernels, smoothers, splines), local likelihood, additive models and trees, neural networks, boosting, and classification, robust estimators. Emphasis will be on applications and interpretation.

Prerequisite: STAT 306.

Reference books:

An Introduction to Statistical Learning, James, G., Witten, D., Hastie, T., and Tibshirani, R., 2013, Springer, New York.

The Elements of Statistical Learning, Hastie, T., Tibshirani, R. and Friedman, J., 2009, 2nd edition, Springer, New York.

Modern Applied Statistics with S, Venables, W.N. and Ripley, B.D., 2002, 4th edition, Springer, New York.

Semiparametric regression, Ruppert, D., Wand, M.P. and Carroll, J., 2003, Cambridge University Press.

Nonparametric and semiparametric models, Härdle, W.K., Müller, M., Sperlich, S., Werwatz, A., 2004, Springer.

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Topics: Prediction models: linear, non-linear, non-parametric models. Splines, penalized regression, smoothing splines, kernel smoothers and local likelihood. Additive models and Generalized Additive Models. Variable selection: step-wise methods, sequencing, shrinkage methods. Regression and classification trees. Boosting. Random Forests. Neural Networks. Support Vector Machines for regression and classification. Robust estimators for linear and non-parametric regression.