Stanford University
Department of Statistics

DEPARTMENTAL SEMINAR

4:15pm, Tuesday, November 12, 2013

*** Note Special Location ***
McCullough Building (04-490) Room 115
Cookies served at 3:45pm, 1st floor Lounge.

Speaker: Jonathan Taylor, Stanford University

Title: Inference for the LAR path, or 2013: A Spacings Odyssey

Abstract:

We take a new look at Least Angle Regression (LAR), a version of forward stepwise regression proposed by Efron et al. (2004). The algorithm sequentially adds variables to a set of active variables until a least squares solution is found. We consider the problem of exact inference after selection by the LAR algorithm, assuming the regression model $y|X \sim N(\mu, \Sigma)$ with $\Sigma = \Sigma(X)$ assumed known and $\mu = \mu(X)$ not necessarily linear in $X$.

We describe an exact version of the covariance test proposed in Lockhart et al. (2013) for each step of the LAR algorithm. Each test is based on an exact pivot for a linear function of $\mu$. We describe how to use these pivots to form exact intervals after selection by LAR.

Throughout, we make almost no assumptions on the design matrix $X$. In asymptotic setting, with additional assumptions on $(X, \mu)$ we describe the limiting behavior of the spacings of the edge of the “noise” events in the LAR path. With an explicitly computable normalization, these spacings converge to a sequence of independent Exp(1) random variables.

This is joint work with Robert Tibshirani, Ryan Tibshirani, and Richard Lockhart.