

STANFORD UNIVERSITY
DEPARTMENT OF STATISTICS
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, February 5th, 2008
Sequoia Hall Room 200
(Cookies at 3:45 in 1st Floor Lounge)

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Variable Inclusion and Shrinkage Algorithms

The Lasso is a popular and computationally efficient procedure for automatically performing both variable selection and coefficient shrinkage on linear regression models. One limitation of the Lasso is that the same tuning parameter is used for both variable selection and shrinkage. As a result, it may end up selecting a model with too many variables to prevent over shrinkage of the regression coefficients. We will discuss a new class of methods called Variable Inclusion and Shrinkage Algorithms (VISA). This approach is capable of selecting sparse models while avoiding over shrinkage problems. VISA uses a path algorithm, so it is computationally efficient. It will be shown through extensive simulations that the new approach significantly outperforms the Lasso and also provides improvements over more recent procedures, such as the Dantzig selector, Relaxed Lasso and Adaptive Lasso.

We will also discuss a new algorithm, DASSO, for fitting the entire coefficient path of the Dantzig selector. A slight simplification of DASSO produces LARS, which is typically used to construct the Lasso path.