

**Rate Consistency of the LASSO for High-Dimensional Model Selection**

by

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***Abstract***

Meinshausen and Bühlmann (2004) showed that, for neighbourhood selection in Gaussian graphical models, under appropriate conditions, the LASSO is consistent even when the number  $p$  of variables is of greater order than the sample size  $n$ . Zhao and Yu (2006) formalized this assumption in the context of linear regression as the irrepresentable condition. They showed that under this condition, the LASSO selects exactly the set of non-zero regression coefficients, provided that these coefficients are bounded away from zero at certain rate. In this paper, we prove that the LASSO selects a model of the right order of dimensionality with the right order of model bias, under a partial Riesz condition on the correlation of design variables, an upper bound on the total absolute value of "small" regression coefficients outside an ideal model, and some mild regularity conditions. An interesting aspect of this result is that  $p$  can be as large as  $\exp(\alpha n)$  for certain small  $\alpha > 0$ .

***All interested are welcome!***  
*For details, please contact ISMT Department.*