

Fast Sparse Regression and Classification

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Linear models are among the most used for statistical prediction. The accuracy of such models suffers when the number of observations is not large compared to the number of predictors. Regularization methods have been proposed to mitigate this problem. These methods fit a linear model to data, based on some loss criterion, subject to a constraint on the coefficient values. For large problems the general choice of loss/constraint combinations is limited by the computation required to obtain the corresponding solution estimates. This is especially the case when non convex constraints are used to induce very sparse solutions. A fast algorithm is presented that produces solutions that closely approximate those for any convex loss, and a wide variety of convex and non convex constraints, permitting application to very large problems. The benefits of this generality are illustrated by examples.