

# Sparse Regularization for High Dimensional Additive Models

*Ming Yuan*

*School of Industrial and Systems Engineering*

*Georgia Institute of Technology*

*Atlanta, Georgia 30332-0205*

`ming.yuan@isye.gatech.edu`

## Abstract

We study the behavior of the  $l_1$  type of regularization for high dimensional additive models. Our results suggest remarkable similarities and differences between linear regression and additive models in high dimensional settings. In particular, our analysis indicates that, unlike in linear regression,  $l_1$  regularization does not yield optimal estimation for additive models of high dimensionality. This surprising observation prompts us to introduce a new regularization technique that can be shown to be optimal in the minimax sense.