AARON BERK, Concordia University

Sensitivity to parameter selection for LASSO programs

Compressed sensing theory explains why LASSO programs recover structured high-dimensional signals with minimax order-optimal error. Yet, the optimal choice of the program's governing parameter is often unknown in practice. It is still unclear how variation of the governing parameter impacts recovery error in compressed sensing, which is otherwise provably stable and robust. We provide an overview of parameter sensitivity in LASSO programs in the setting of proximal denoising; and of compressed sensing with subgaussian measurement matrices and gaussian noise. We demonstrate how two popular ell-1-based minimization programs exhibit sensitivity with respect to their parameter choice and illustrate the theory with numerical simulations. For example, a 1% percent error in the estimate of a parameter can cause the error to increase by a factor of 10^9, while choosing a different LASSO program avoids such sensitivity issues. We hope that revealing parameter sensitivity regimes of LASSO programs helps to inform a practitioner's choice.