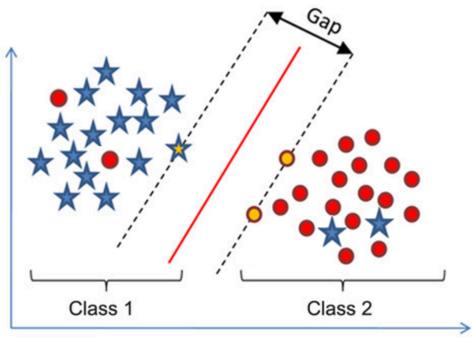
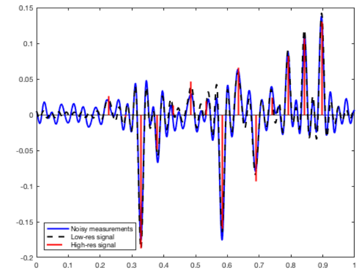


Convex Optimization in Machine Learning: Multistage Relaxation for Non-Convex Objectives

(Joseph Castagneri, Denis Kazakov, Davis Yoshida)

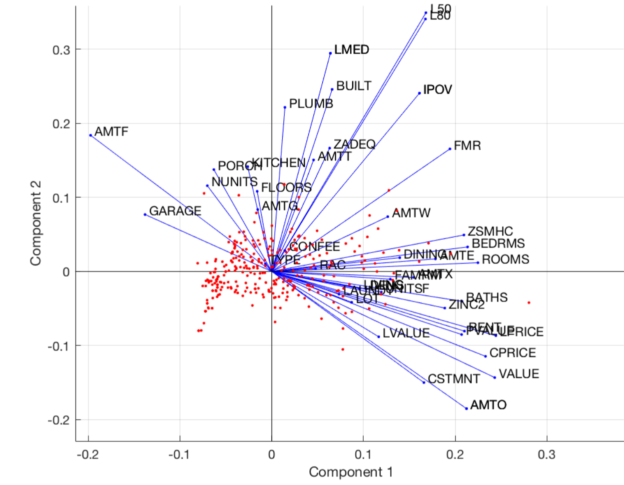


On Superresolution

(Rachel Robey & Nicole Woytarowicz)

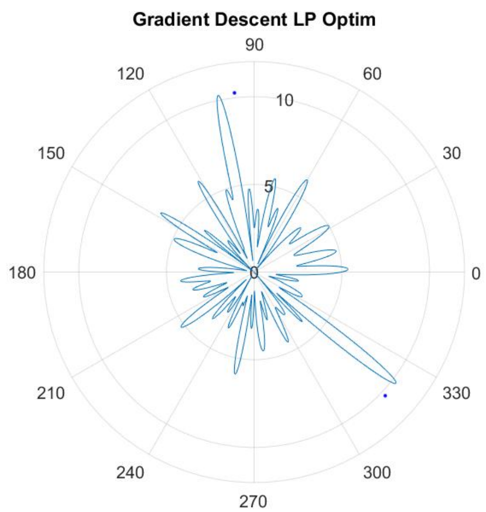
$\min_{\tilde{x}} \|\tilde{x}\|_{TV}$ subject to $\mathcal{F}_c \tilde{x} = y$

Consider the dual to shift instead to infinite-dimensionality in the constraints



A Convex Optimization Procedure for Missing Data Principle Components Analysis with applications to Econometrics

(Theodore Naff)



APPM 4720/5720 (special topics)
"Advanced Convex Optimization"
Prof. Becker, spring 2017
Student projects

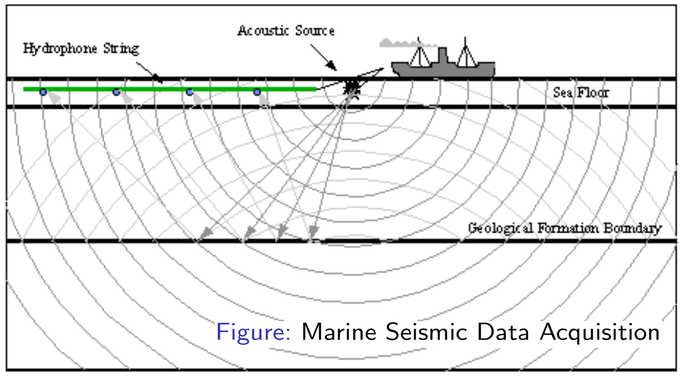


Figure: Marine Seismic Data Acquisition

Optimal Beamforming Given Positional Array Element Uncertainty

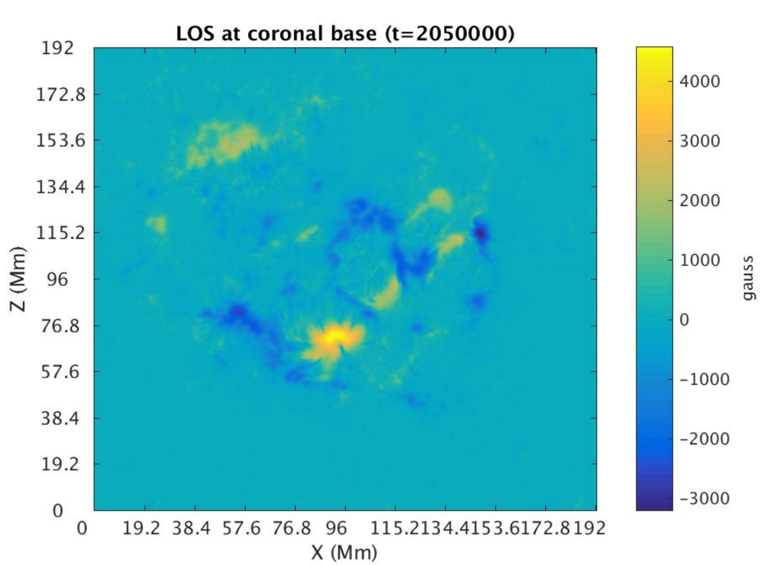
(Michael Fromandi, Ryan Montoya, Erez Shani)

The Adjoint State Method Applied to Seismic Migration

(Ryan Mustari, Derek Driggs, Jon Lavington)

Kernel regression in PDE approximation

(Nathaniel Mathews)



Largest Exchangeable Component: finite case

(Antony Pearson)

- Let $\mathcal{P}$ be a joint distribution over $(X_1, \ldots, X_d)$, with $d < +\infty$, and each $X_i \in \mathcal{X}$, with $|\mathcal{X}| = k$.
- $\mathcal{P}$ can be written as a mixture $\mathcal{P} = \lambda \cdot \mathcal{Q} + (1-\lambda) \cdot \mathcal{S}$, $0 \leq \lambda \leq 1$, where $\mathcal{Q}$ is exchangeable and $\mathcal{S}$ is some other distribution.
- We wish to find the largest possible λ.

The results of the weighted simplex search, along with the analytical form for the optimum in the bivariate Bernoulli case, motivated the following theorem:

Theorem

For a given source $\mathcal{P}$ over $\mathcal{X}^d$, the maximum possible weight of any exchangeable component of $\mathcal{P}$ is

$$\lambda^* = \sum_{\Sigma \in \Upsilon} |\Sigma| \cdot \min_{\sigma \in \Sigma} \mathcal{P}(\sigma), \tag{1}$$

and this weight is uniquely achieved by the measure $\mathcal{Q}^*$ which, for each $\Sigma \in \Upsilon$, gives equal mass $\min_{\sigma\in\Sigma} \frac{\mathcal{P}(\sigma)}{\lambda^*}$ to each $x \in \Sigma$.

An Introduction to Differential Dynamic Programming for Optimal Control Problems

(Manuel Díaz Ramos David Iglesias Echavarría Christopher Rabotin)