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Research interests include:

- **Continuous optimization**
- **First-order methods**

On-going GRF project

New solution methods for a class of structured optimization problems

Abstract

In this project, we will consider new solution methods for a class of structured optimization problems. These problems arise as different models in important applications like compressed sensing, matrix completion and the system identification or realization problems from the control literature, and are either convex or nonconvex optimization problems that approximate the original problems. These problems are usually presented in large scale, involving millions of variables.

Our work will be conducted along two lines. On the one hand, we will revisit the existing representative convex models in these application fields from the gauge duality perspective, which leads to structurally much simpler dual problems. Taking advantage of the simplicity of these dual formulations, we will develop new algorithms for solving them. In particular, this dual perspective enables us to develop algorithms that work on a lower dimension and can incorporate more structure of the problem to speed up the solution process. On the other hand, motivated by the empirical effectiveness of various existing nonconvex models in the aforementioned applications, we will develop general iterative schemes that can solve a large class of existing and new nonconvex models. Development of such methods will encourage the proposal and study of new nonconvex models for the above applications.