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構造化制約付き最適化問題の効率的な解法の開発と機械学習への応用

研究成果の概要

In this fiscal year, we revised the paper submitted in last July and resubmitted it to an optimization journal *Computational Optimization and Applications* (under minor revision now).

Besides this, we consider an optimization model with l0-norm regularizer (for inducing better sparsity than other regularizers) and an ordered constraint that represents the monotonicity property of variables. This model covers various practical applications such as landslide surveillance, weather forecast and stock market volatility forecasts. We have done the following research work so far:

1. We considered a reformulation of l0-norm regularizer and then applied an exact penalty method, which allows to apply the algorithm proximal alternating linearization method (PALM) with subproblems efficiently solved by an existing solver the pool adjacent violators algorithm (PAVA).
2. We proved the convergence properties of our method and illustrated its efficiency by numerical experiments. Compared with another method which combines a smoothing technique with the well-known proximal gradient algorithm (PGA) on sparse and ordered signal recovery, our method outperforms PGA in terms of recovery accuracy and CPU time.

【代表的な原著論文情報】

1) Tianxiang Liu, Ting Kei Pong and Akiko Takeda. Doubly majorized algorithm for sparsity-inducing optimization problems with regularizer-compatible constraints. *Submitted to Computational Optimization and Applications*, currently at ***Minor Revision***.