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ONE WORLD OPTIMIZATION SEMINAR

December 13th 2021 @ 15:30 CET (Central European Time)

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Projection-Efficient First-Order Methods for Convex Low-Rank Matrix Optimization

Abstract. Optimization problems in which the goal is to recover a low-rank matrix from given measurements/data capture many important applications in data science and machine learning such as the celebrated matrix completion problem, robust principal component analysis and many more. While these optimization problems are in general NP-Hard, convex relaxations, which are based on trace-norm regularization, have proven to be, both in terms of statistical theory point of view and empirically, a successful approach in many cases, and have received significant research interest in the past decade. However, solving these relaxations in large scale is often not considered practically tractable, since most first-order methods cannot avoid the need to store high-rank matrices and/or to compute high-rank spectral decompositions (e.g., for projecting onto the trace-norm ball) during the optimization process.
In this talk I will try to (partially) answer the question: when do first-order methods for such relaxations are guaranteed to store/manipulate only low-rank matrices? Mainly, I will show that a (generalized) strict complementarity condition implies that, at least locally, popular first-order methods indeed converge (often with their original rate guarantees) while only requiring to store/manipulate low-rank matrices.

The link of the zoom-room of the meeting and the corresponding password will be announced the day before the talk on the mailing list of the seminar, to which one can subscribe on https://owos.univie.ac.at.