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## ONE WORLD OPTIMIZATION SEMINAR

February 14<sup>th</sup> 2022 @ 15:30 CET (Central European Time)

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### **Accelerated Alternating Minimization Methods with Application to Optimal Transport**

**Abstract.** Motivated by the optimal transport problem, we consider Sinkhorn's algorithm, which is an alternating minimization (AM) procedure, and accelerated primal-dual gradient method. For both algorithms, we discuss their arithmetic operations complexity for solving the non-regularized optimal transport problem and compare these two approaches. After that, we propose a combination of alternating minimization and Nesterov-type momentum acceleration that gives a generic accelerated alternating minimization method for smooth problems. We prove an  $n/k^2$  convergence rate in terms of the objective residual for convex problems and a  $n/k$  rate in terms of the squared gradient norm for non-convex problems, where  $k$  is the iteration counter, and  $n$  is the number of alternating blocks of variables. Our method requires the knowledge of neither the convexity of the objective nor the objective's parameters, such as the Lipschitz constant of the gradient, i.e., it is adaptive to convexity and smoothness. Further, we develop its primal-dual modification for strongly convex problems with linear constraints. We consider two applications of our methods: non-convex collaborative filtering problem and optimal transport problem, where our primal-dual method takes the form of accelerated Sinkhorn's algorithm.

*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>.*