Fakultät für Mathematik
Oskar-Morgenstern-Platz 1
A-1090 Vienna
Austria

ONE WORLD OPTIMIZATION SEMINAR

December 6th 2021 @ 15:30 CET (Central European Time)

KONSTANTIN MISHCHENKO

(KAUST)

Regularized Newton Method with Global O(1/k^2) Convergence

Abstract. We present a Newton-type method that converges fast from any initialization and for arbitrary convex objectives with Lipschitz Hessians. We achieve this by merging the ideas of cubic regularization with a certain adaptive Levenberg--Marquardt penalty. In particular, we add the identity matrix scaled by the square root of the gradient norm to the Hessian, and obtain a method that converges with $O(1/k^2)$ rate. Our method is the first variant of Newton's method that has both cheap iterations and provably fast global convergence. Moreover, we prove that locally our method converges superlinearly when the objective is strongly convex. To boost the method's performance, we present a line search procedure that does not need hyperparameters and is provably efficient.

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.