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ONE WORLD OPTIMIZATION SEMINAR

January 10th 2022 @ 15:30 CEST (Central European Summer Time)

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Nonconvex Min-Max Optimization

Abstract. Recent applications that arise in machine learning have surged significant interest in solving min-max optimization problems. This problem has been extensively studied in the convex-concave regime for which a global optimal solution can be computed efficiently. In the nonconvex (smooth) regime, on the other hand, most problems cannot be solved to any reasonable notion of stationarity. In this work, we present different classes of smooth nonconvex min-max problems that can be solved efficiently up to first-order stationarity of its Moreau envelope. In particular, we propose efficient algorithms for finding (first-order) stationary solutions to nonconvex min-max problems classes when the inner maximization problem is concave or when the diameter of the constraint set for the inner maximization problem is "small". Our results are the first of its kind that find stationary solutions to nonconvex-nonconcave min-max problems without assuming any restriction on the objective function (other than standard smoothness assumptions). We also discuss the validity of our assumptions in various applications and evaluate the performance of our algorithm on different applications including training adversarially robust neural networks, fair machine learning, data imputation, and training generative adversarial networks.

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>.