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## ONE WORLD OPTIMIZATION SEMINAR

April 5<sup>th</sup> 2021 @ 15:30 CEST (Central European Summer Time)

**HENRY WOLKOWICZ**

(University of Waterloo)

### **Robust Interior Point Methods for Quantum Key Rate Computation for Quantum Key Distribution**

**Abstract.** We use facial reduction on the nonlinear objective function and derive a stable reformulation of the quantum key rate for finite dimensional quantum key distribution (QKD) problems. This avoids the difficulties for current algorithms from singularities that arise due to loss of positive definiteness for the distributions. This allows for the derivation of an efficient Gauss-Newton interior point approach. We provide provable lower and upper bounds for the hard nonlinear semidefinite programming problem.

Empirical evidence illustrates the strength of this approach as we obtain high accuracy solutions and theoretically guaranteed upper and lower bounds for QKD. We compare with other current approaches in the literature.

Joint work with: Hao Hu, Jiyoung Im, Jie Lin, Norbert Lutkenhaus.

*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>.*