Contribution ID: **77** Type: **not specified**

Quantum Algorithms and Lower Bounds for Linear Regression with Norm Constraints

Thursday, July 13, 2023 10:30 AM (20 minutes)

Yanlin Chen and Ronald de Wolf

Abstract: Lasso and Ridge are important minimization problems in machine learning and statistics. They are versions of linear regression with squared loss where the vector $\theta \in \mathbb{R}^d$ of coefficients is constrained in either ℓ_1-norm (for Lasso) or in ℓ_2-norm (for Ridge). We study the complexity of quantum algorithms for finding ϵ-minimizers for these minimization problems. We show that for Lasso we can get a quadratic quantum speedup in terms of d by speeding up the cost-per-iteration of the Frank-Wolfe algorithm, while for Ridge the best quantum algorithms are linear in d, as are the best classical algorithms. As a byproduct of our quantum lower bound for Lasso, we also prove the first classical lower bound for Lasso that is tight up to polylog-factors.

Presenter: DE WOLF, Ronald

Session Classification: Track A-1