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Analysis and Design of Optimization Algorithms Using Tools From Control Theory

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Abstract

First-order methods provide robust and efficient solutions to large-scale optimization problems. Recent advances in the analysis and design of first-order methods have been fueled by tools from controls, including integral quadratic constraints and multipliers from robust control. Similar advances have been made in the optimization community through the (related) performance estimation framework. Together, these tools have transformed the way in which we analyze and design optimization methods. This talk will provide an overview of these tools and set the stage for the remainder of the session.

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