

On the Passage from Local to Global in Optimization: New Challenges in Theory and Practice

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Large scale problems in the design of networks and energy systems, the biomedical field, finance, and engineering are modeled as optimization problems. Humans and nature are constantly optimizing to minimize costs or maximize profits, to maximize the flow in a network, or to minimize the probability of a blackout in the smart grid. Due to new algorithmic developments and the computational power of machines, optimization algorithms have been used to solve problems in a wide spectrum of applications in science and engineering. In this talk, I we are going to address new challenges in the theory and practice of optimization, including exact approaches, approximation techniques, and heuristics. First, we have to reflect back a few decades to see what has been achieved and then address the new research challenges and directions.