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Jesús A. De Loera* (deloera@math.ucdavis.edu), Dept. of Mathematics, Univ. of California, Davis, CA 95618. *Algebraic, Geometric, and Topological Methods in Optimization*.

Optimization is the part of applied mathematics that seeks the best answer or optimal element, according to an objective function or optimization criterion, from among a domain of many possible solution values. This could mean the shortest path on a network, the optimal assignment of jobs in a company, or the best distribution of fire stations in a city. Optimization is at the core of techniques in machine learning, bioinformatics, management and operations planning, finances, and many other areas.

Mathematical optimization began to develop steadily only in the 1940's with contributions of mathematicians like George Dantzig, Ralph Gomory, John von Neumann, Harold Kuhn, Albert W. Tucker, and other pioneers. In my talk I wish to recount, through independent examples, how algebraic, geometric, and topological techniques have brought recent advances to the theory of optimization.

In my examples I will show how a rich mixture of algebraic geometry, convex and tropical geometry, and combinatorial topology appears in the analysis of algorithms for the linear optimization problem. My survey talk will be accessible to non-experts and students, who are encouraged to come and see how the dividing line between pure and applied mathematics can be erased. (Received July 24, 2018)