Subgradients of Minimal Time Functions and Applications to Set Facility Location

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In this talk, we present our ongoing efforts in solving a number of continuous facility location problems that involve sets using recently developed tools of variational analysis and generalized differentiation. Subgradients of a class of nonsmooth functions called minimal time functions are developed and employed to study these problems. Our approach advances the applications of variational analysis and optimization to a well-developed field of facility location, while shedding new light on well-known classical geometry problems such as the Fermat-Torricelli problem, the Sylvester smallest enclosing circle problem, and the problem of Apollonius.