1067-49-684   **Boris Mordukhovich**, 656 W. Kirby, Detroit, MI 48202, and **Nguyen Mau Nam***
(`nguyenmn@utpa.edu`), 1201 W. University Drive, Edinburg, TX 78539. *Applications of Nonsmooth Optimization to a Generalized Fermat-Torricelli Problem.*

In this talk we present new applications of generalized differentiation and nonsmooth optimization to the following optimization problem and its specifications: given n closed subsets of a Banach space, find such a point for which the sum of its distances to these sets is minimal. This problem can be viewed as an extension of the celebrated Fermat-Torricelli problem: given three points on the plane, find another point such that the sum of its distances to the designated points is minimal. Based on advanced tools and recent results of generalized differentiation and nonsmooth optimization, we derive necessary as well as necessary and sufficient optimality conditions for the extended version of the Fermat-Torricelli problem under consideration, which allow us to completely solve it in some important settings. Furthermore, we develop and justify a numerical algorithm of the subgradient type to find optimal solutions in convex settings and provide its numerical implementations. (Received September 13, 2010)