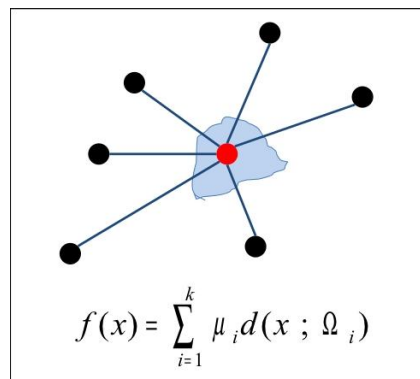


# Secret Student Seminar

Experimental Algebra & Geometry Lab

Applications of Convex Optimization to Weighted Generalized  
Fermat-Torricelli and Heron Problems

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## Abstract

In the Fermat-Torricelli problem, a point is to be found on a plane such that the sum of the distances from the solution point to three given target points is smallest. In the similar Heron problem, we are asked to find a point in a line such that the sum of the distance to two target points is minimal. This problem can be solved by differential calculus or geometry. However, a generalized version of this problem significantly broadens the applications of its solution. For this purpose, we replaced the target points in the Fermat-Torricelli problem by disjoint convex sets and let the solution point lie in a constraint set. Additionally, we modified the sum of the distances to a general weighted sum and considered non-differentiable distance functions. The solution to this problem has several applications in location science and optimal networks. By using modern tools of convex analysis and optimization, we have been able to find a numerical solution to this problem and developed algorithms to demonstrate this solution with different types of sets.

Date: Friday, October 7, 2011

Time: 2:00pm–3:00pm

Place: MAGC 1.302

For further information or for special accommodations, please contact Dr. Sean Lawton via email at [lawtonsd@utpa.edu](mailto:lawtonsd@utpa.edu).