FLT: Fermat’s Last Triangle

Abstract- The unweighted total distance location problem, as stated by Fermat, is to find a point $X$ in the plane that minimizes the sum of the Euclidean distances from $X$ to three given points $P_1$, $P_2$, $P_3$. The weighted total distance problem assumes a positive weight $w_i$ associated with each given point and seeks the point $X$ that minimizes the total weighted distance to the three points. A geometrical solution and geometrical dual was discovered by Toricelli and Simpon for the unweighted problem. This paper extends the geometrical solution and dual to the weighted problem. A proof of the geometrical solution is offered in the style of the famous ”Hungarian Proof” for the unweighted case.