

1086-VM-2220 **Michael de Villiers*** (profmd1@mweb.co.za), Private Bag X03, ASHWOOD, KZN 3605, South Africa. *From the Fermat point to a generalization and some applications.*

The paper will start with the problem of finding a point that minimizes the sum of the distances to the vertices of an acute-angled triangle, a problem originally posed by Fermat in the 1600's, and apparently first solved by the Italian mathematician and scientist Evangelista Torricelli. Ceva's theorem will be used to prove the following generalization of the Fermat-Torricelli point: "If triangles DBA, ECB and FAC are constructed outwardly (or inwardly) on the sides of any triangle ABC so that angle DAB = angle CAF, angle DBA = angle CBE and angle ECB = angle ACF, then DC, EA and FB are concurrent."

Though this generalization is not new, with the earliest proof from 1936 by W. Hoffer, the presented proof presented in this paper will be distinctly different. Of practical relevance is that this Fermat-Torricelli generalization can be used to solve a 'weighted' airport problem, for example, when the populations in the three cities are of different size. Apart from this practical application, this Fermat generalization easily proves the two other, relatively new, concurrency results as well. (Received September 25, 2012)