



A New Characterization of the Symmedian Point

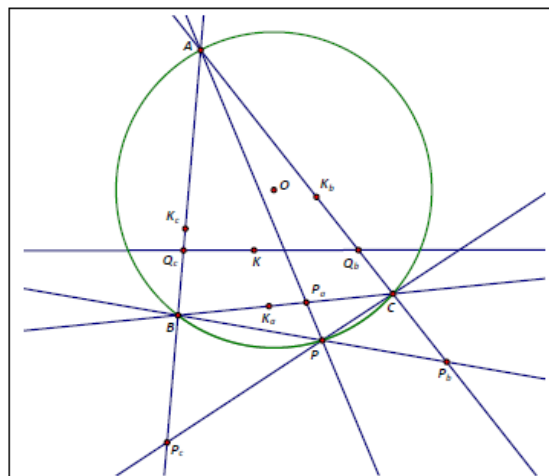
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Associated to any triangle $\triangle ABC$ in the plane $\mathcal{E}$ is its symmedian point K . The symmedian point K has a rich history. It was not discovered by one person at any one time. Instead, it gradually came into prominence by multiple investigators recognizing its various geometric properties. For example, let $a = BC$, $b = CA$, and $c = AB$. Let Δ be the area of $\triangle ABC$. Then K is the unique point in $\mathcal{E}$ which minimizes the sum of the square distances from itself to the extended sides of $\triangle ABC$. Moreover, this minimum is

$$\frac{4\Delta^2}{a^2 + b^2 + c^2}.$$

A second characterization is that K is the unique point in $\mathcal{E}$ which is the centroid of its pedal triangle. There are several other characterizations of K .

This talk will outline recent work of Yu Chen and myself that gives a new characterization of the symmedian point, one that is fundamentally different than all other characterizations. Through the use of barycentric coordinates, the point K is characterized in terms of the barycentric coordinates of the points lying on the circumcircle $\mathcal{C}$ of $\triangle ABC$. The motivation for the characterization comes from a well known proof of the Ceva Concurrency Theorem using barycentric coordinates.



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PS 308

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