The Locus of Mid-Tangent Points of Planar Curves

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In this project, we defined a mid-tangent point with respect to a fixed point X and a tangent at a point P on planar curve C as a point on the tangent that is equidistant from X and P. We studied the locus of mid-tangent points of conic sections. We found that the locus of mid-tangent points of most conic sections are non-linear curves. However, we observed and proved by using Euclidean geometry that the locus of mid-tangent points of circle is straight lines. The mapping defined by mid-tangent points was studied further. The similarity between a mid-tangent projection and a stereographic projection was displayed as a one – to – one correspondence function. We also extended the concept of mid-tangent points to three-dimensional space and found that the similarity with the stereographic projection was retained in higher dimensions. Finally, we applied the locus of mid-tangent points of a sphere to create any specified region; e.g., creating maps of Thailand and California.

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