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Generalizations of the Circumcenter, the Exeter Point, X(25), and the Euler Line

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1. Introduction

We introduce a new generalization of the Euler line and encourage proofs of it.

2. Results

Theorem 2.1. *Let A, B, and C be the vertices of a given triangle.*
Let D be a point in the plane not on a side of ABC.
Let E be a point in the plane not on a side of ABC which is different from D.
Let A' be the reflection of A about D.
Let B' be the reflection of B about D.
Let C' be the reflection of C about D.
Let $\mathcal{E}$ be the conic passing through A, B, C, A', B', and C'.
Let α be the tangent line at A.
Let β be the tangent line at B.
Let γ be the tangent line at C.
Let α and β intersect at F.
Let α and γ intersect at G.
Let β and γ intersect at H.
Let lines AB and CE intersect at I.
Let lines AC and BE intersect at J.
Let lines BC and AE intersect at K.
Let line CE intersect $\mathcal{E}$ at L.

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Let line BE intersect $\mathcal{E}$ at M.
Let line AE intersect $\mathcal{E}$ at N.
Let δ be the tangent line at L.
Let ε be the tangent line at M.
Let ζ be the tangent line at N.
Let δ and ε intersect at O.
Let ε and ζ intersect at P.
Let δ and ζ intersect at Q.
Then,
1. *Lines FL, GM, and HN are concurrent at R,*
2. *Lines FI, GJ, and HK are concurrent at S,*
3. *Lines AO, BQ, and CP are concurrent at T, and*
4. *R, S, E, and T are collinear.*

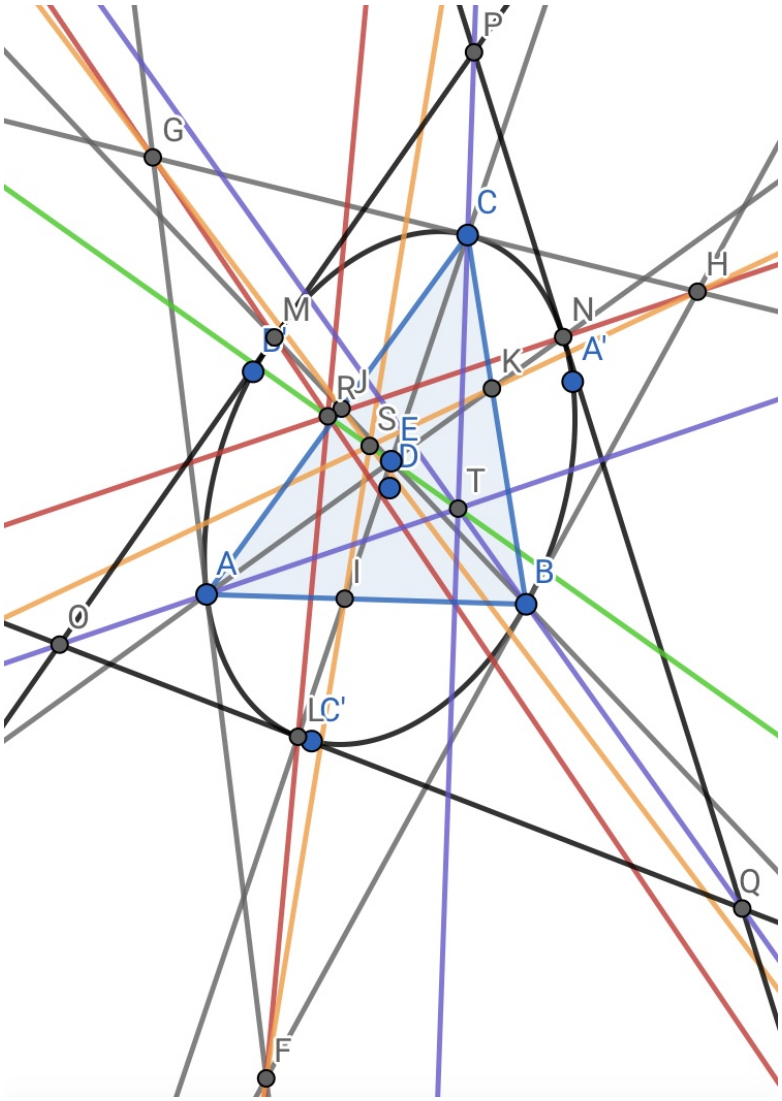

Figure 1. Illustration.

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