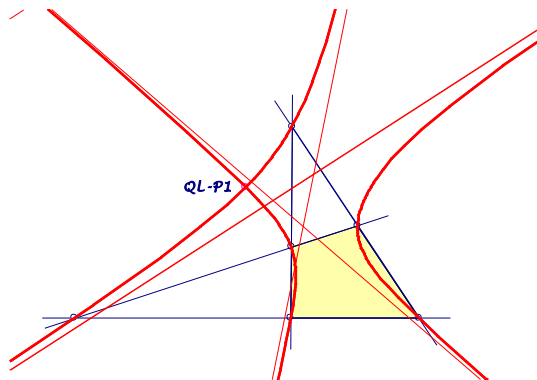


Background for these notes is:  
 Chris van Tienhoven: Encyclopedia of Quadri-Figures  
<http://www.chrisvantienhoven.nl/>

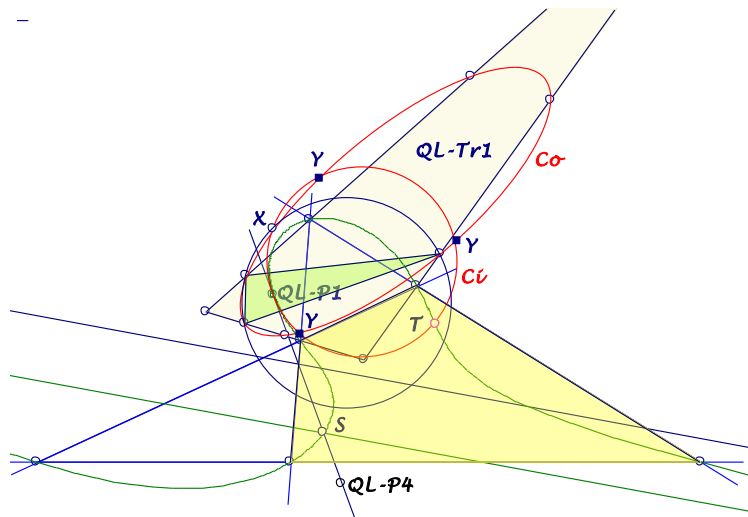
**A new Cubic for a Quadrilateral II  
 (the Asymptotes)**

*This is an addition to EQF-Note 2015-07-04 in QFG-message 1215, giving a construction for the one or three asymptotes of the cubic. The results are only CABRI-controlled.*



Remember the isoconjugation \* for the Ceva triangle  $\Delta$  of  $QL-P1$  wrt the  $QL$ -Diagonal Triangle  $QL-Tr1=ABC$  with the Miquel Point  $QL-P1$  as fixed point. This isoconjugation maps the line at infinity into the Nine-point Conic  $QA-Co1=Co$  of  $A, B, C$  and  $QL-P1$ , which is the circumconic of  $\Delta$  and the medial triangle of  $QL-Tr1$ .

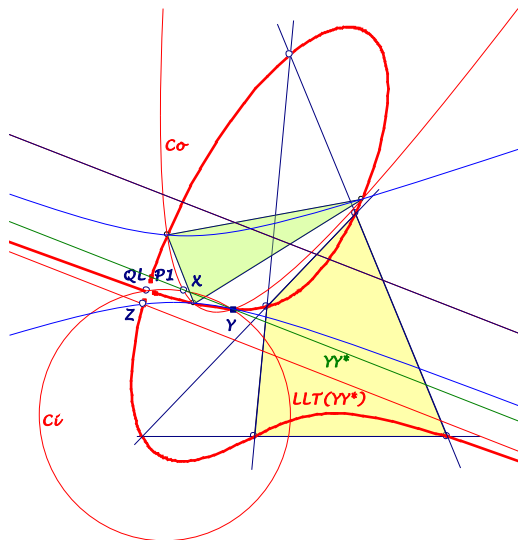
On the other hand we consider the  $CSC$ -image  $Ci$  of the asymptote of  $QL-Cu1$  (a parallel to the Newton Line  $QL-L1$  through the reflection of  $QL-P1$  in  $QL-L1$ ). This circle  $Ci$  contains  $QL-P1$  and  $T$  ( $CSC$ -image of the intersection  $S$  of  $QL-Cu1$  and its asymptote) and is tangent to  $QL-P1.QL-P4$ .



There can be 4 intersections of the circle  $C_i$  and the conic  $C_o$ . One intersection  $X$  lies on the circumcircle of  $\Delta$ . The other intersections  $Y$  lie on the cubic and give with their isoconjugate  $Y^*$  the directions of the asymptotes. So there can be one or three asymptotes.

The line-line transformation  $LLT$  – discussed in *EQF-Note* 2015-06-30 (*QFG-* message 1205) – gives the ...

**...asymptotes  $LLT(YY^*)$ .**



The isoconjugate of  $YY^*$  gives a hyperbola with one asymptote parallel  $YY^*$ . The intersection

$$(YY^*)^* \cap LLT(YY^*)$$

is the intersection  $Z$  of the cubic and its asymptote.

Eckart Schmidt

<http://eckartschmidt.de>

[eckart\\_schmidt@t-online.de](mailto:eckart_schmidt@t-online.de)