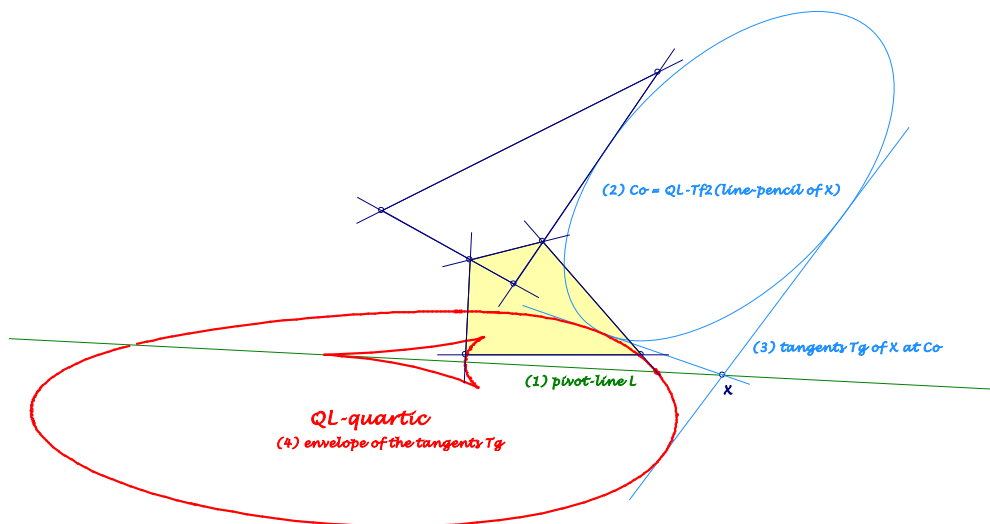


EQF-Note 2016-06-15

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

Dual Cubics and Quartics

The construction concept for points of pivotal QA-isocubics can be used for lines, to get QL-quartics, whose duals are pivotal QA-isocubics of a well-known type.



Pivotal QA-Cubics

$QA-Cu1$, 2, 3, 4, 5 are pivotal isocubics wrt the diagonal triangle $DT = QA-Tr1$ and the isoconjugation $QA-Tf2$. A construction concept can be described as follows:

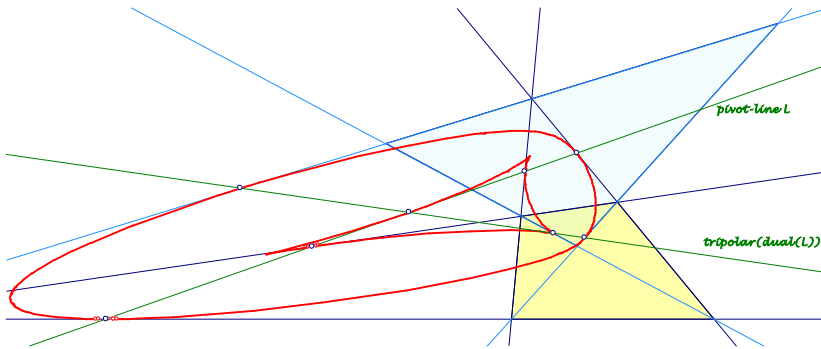
- Let P be the pivot-point,
- ... take lines L through P
- ... and their $QA-Tf2$ images, which give DT -circumconics Co .
- ... The intersections of L and Co give the pivotal QA -isocubic.

Pivotal QL-Quartics

This construction concept can be translated in QL -geometry, using the diagonal triangle $DT = QL-Tr1$ and the line isoconjugate $QL-Tf2$ (see figure above):

- Let L be a pivot-line,
- ... take points X on L ,
- ... and the $QL-Tf2$ images for the line pencil of X , which envelop a DT -inscribed conic Co .
- ... The tangents of X at Co envelop the pivotal QL -quartic.

- **Pivotal QL -quartics are**
 ... tangent to the four QL - lines
 with contact points on the pivot-line,
 ... tangent to the three DT -lines
 with contact points on the tripolar($\text{dual}(L)$),
 ... tangent to the pivot-line
 with contact point also on tripolar($\text{dual}(L)$).

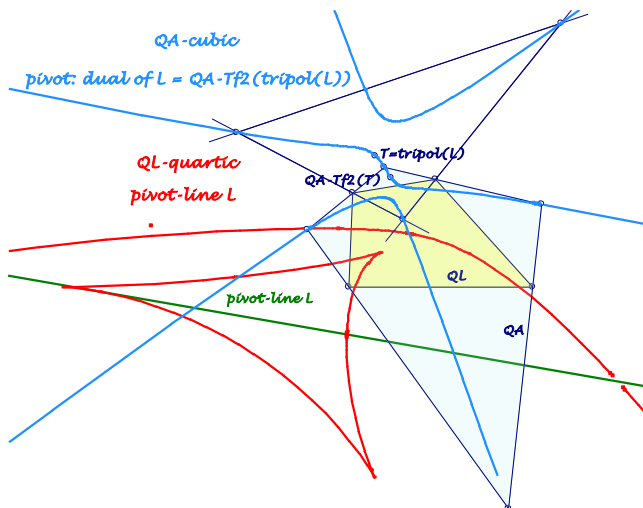


If the pivot-line bears a QL -point S , the QL -quartic degenerates in the point S and a conic, tangent to two QL -lines and two diagonals, not containing S .

- **Pivotal QL -quartics are QL - Tf_2 -invariant wrt their tangents (QL - Tf_2 swaps tangents from X at Co).**

Dual QL -Quartics and QA -Cubics

Now we consider a constellation of dual QA and QL with common diagonal triangle DT (in the sense of QFG -message 1516).



- **The dual of a pivotal QL -quartic with pivot-line L is a pivotal QA -isocubic**
 ... wrt the common diagonal triangle DT ,
 ... the isoconjugation QA - Tf_2
 ... and a pivot, which is the dual of the pivot-line L ,
 the QA - Tf_2 image of the DT -tripol of L .

On the other hand:

- The dual of a pivotal $QA-Tf2$ -isocubic with pivot P is a QL -quartic with pivot-line $\text{dual}(P)$, the $QL-Tf2$ -image of the DT -tripolar of P .

Examples

- $QA-Cu1$: dual of a QL -quartic with pivot-line tripolar($QA-P41$).
- $QA-Cu2$: dual of a QL -quartic with pivot-line tripolar($QA-P17$).
- $QA-Cu3$: dual of a QL -quartic with pivot-line $QL-L1$.
- $QA-Cu4$: dual of a QL -quartic with pivot-line tripolar($QA-P18$).
- $QA-Cu5$: dual of a QL -quartic with pivot-line tripolar($QA-P20$) (orthogonal $QL-L6$ through $QL-P19$).

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