EQF-Note 2014-05-21

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

Construction of Eckart´s Cubic *QL-Cu2*
(2nd possibility)

QL-Cu2 is the cubic for the centers of 27 cardioids tangent to four lines. A first construction with the asymptotes is described in EQF-Note 2014-05-17 (QFG-message 541), here is a further possibility, using the asymptotes and the Hessian QL-Quasi Isogonal Cubic QL-Cu1, which are constructible.
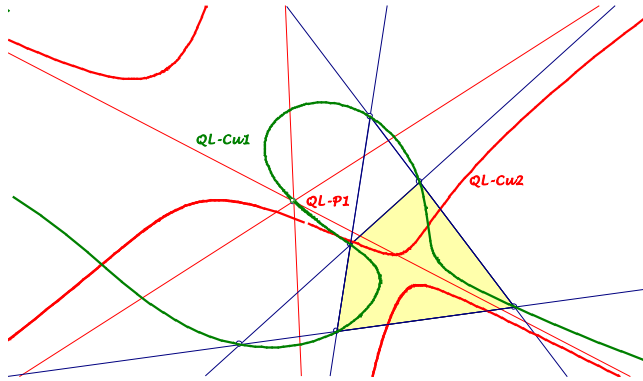

The asymptotes of *QL-Cu2* intersect in the Miquel Point *QL-P1* with angles of 60°. They are parallel to the axes of the Kantor-Hervey Deltoid *QL-Qu2*, which is tangent to the lines of the quadrilateral and centered in *QL-P3*. There is a construction of the asymptotes – related to Bernard Keizer – in *EQF-Note 2014-05-17*.

The Hessian of *QL-Cu2* is *QL-Cu1*. There are several constructions discussed in *QFG*-messages. Here a short summary (see *QFG*-message 188). There are two possibilities, see brackets:

- Let *F1, F2* be the foci of an inscribed conic with center *QL-L1∩QL-L6,*
- *C1* circle with diameter *F1F2*.
- If the main axis of the inscribed conic is *QL-L1* (orthogonal *QL-L1*),
- let *O* be a variable point on *QL-L1*
- as midpoint of a circle *C2* perpendicular *C1* (through *F1,F2*),
- then the lines *O.QL-P1* cut *C2* in points of *QL-Cu1*.

Construction of *QL-Cu2*
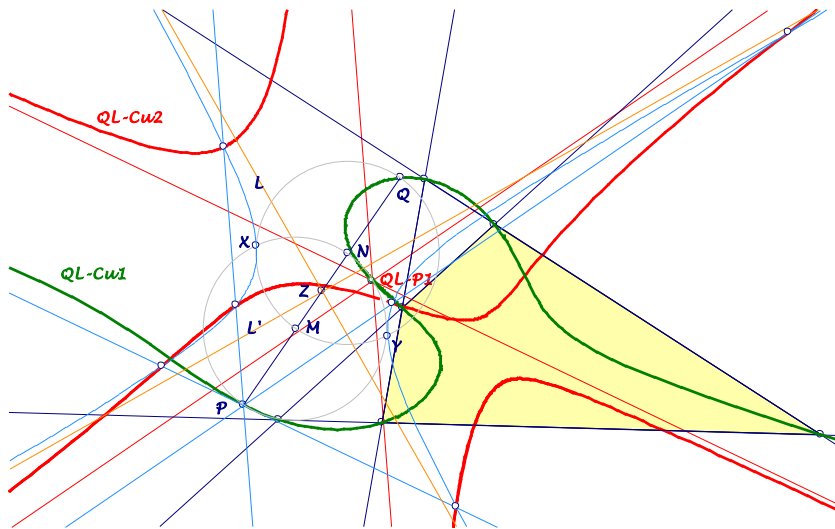
- *P* point on *QL-Cu1*,
- *Q = QL-Tf1(P)* Clawson-Schmidt Conjugate of *P*,
- *Z* midpoint *P.Q,*
- *M, N* points trisecting *P.Q,*
- *X, Y* intersections of circle round *M* through *N* and circle round *N* through *M*,
- *L, L´* parallels through *Z* wrt the angle bisectors of *QL-L1* and *Q.QL-P1*,
- *Hy* orthogonal hyperbola through *X, Y* with axes *L, L´.*
- Parallels to the asymptotes through *P* cut the orthogonal hyperbola *Hy* in points of *QL-Cu2*.

Eckart Schmidt
http://eckartschmidt.de
eckart_schmidt@t-online.de