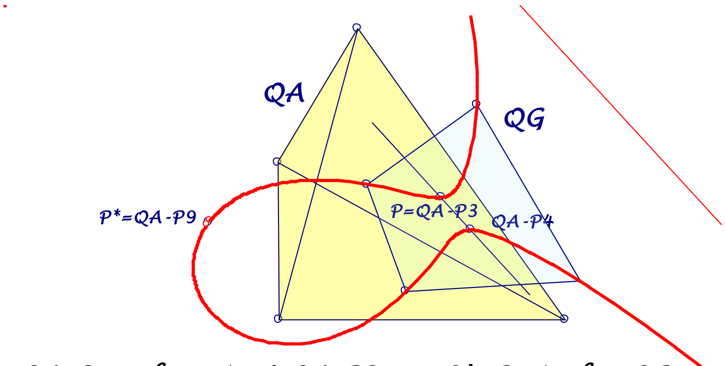
EQF-Note 2015-09-11

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

QA-Cubics as QL-Cu1

For a non-cyclic quadrangle a cubic can be defined wrt a pivot P and the QA-Möbius Conjugate QA-Tf4 as transformation. This cubic QA-Cux – dependend on a pivot P – can be interpreted as QL-Quasi Isogonal Cubic QL-Cu1 of special quadrigons. – The results are only Cabri-controlled.

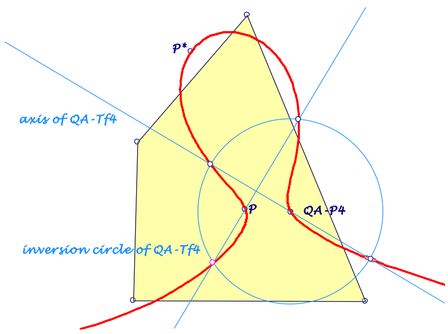


QA-Cux for pivot QA-P3 as QL-Cu1 of a QG

- **Definition of the cubic for non-cyclic quadrangles:**
  The cubic *QA-Cux* is the locus for intersections of lines through a pivot *P* and their *QA-Tf4*-image circles.

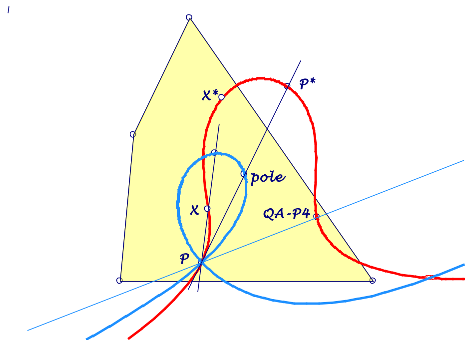
- ***QA-Cux* is invariant wrt *QA-Tf4* (*).**

- **The pivot *P*, its *QA-Tf4*-image *P** and *QA-P4* lie on *QA-Cux*, also the fixed points of *QA-Tf4*.**



- **Further points on *QA-Cux* are the intersections (≠ pivot *P*) of a perpendicular line through *P* wrt the *QA-Tf4*-axis and the inversion circle of *QA-Tf4*.**

- **The asymptote of *QA-Cux* is a parallel to *P.QA-P4* through the reflection of *P** in *P.QA-P4*.**

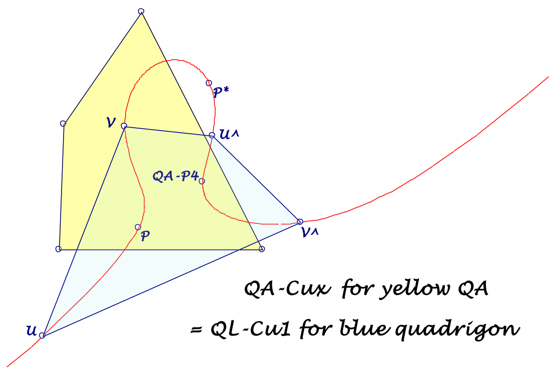


- **The midpoints of *QA-Tf4*-partners on *QA-Cux* give a strophoid of *P.QA-P4* with fixed point *P* and pole in the midpoint of *P.P**.**

QA-Tf4 and *QL-Tf1* are Möbius transformations, which are the reflection in an axis followed by an inversion wrt a circle, centered on the axis (see *EQF*). A Möbius transformation is determined by the center *Z* of the inversion circle and two image partners *X*, *Y*. For *QL-Tf1*: *Z=QL-P1* and *X*, *Y* e.g. opposite vertices of the *QL*, for *QA-Tf4*: *Z=QA-P4* and *X*, *Y* e.g. *QA-P3*, *QA-P9* (see *EQF*). Wrt the here discussed *QA-Cux* let us consider …

… a Möbius transformation (^) with center *P and image partners *P* and *QA-P4* (or the fixed points of *QA-Tf4*).**

- ***QA-Cux* is invariant wrt this Möbius transformation.**

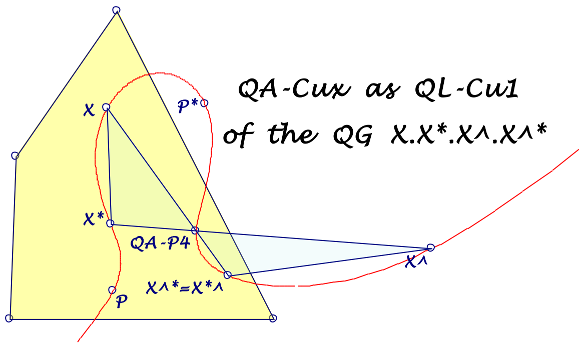


- **For two points *U* and *V* on *QA-Cux* the quadrigon *U.V.U^.V^* has *QA-Cux* as *QL*-Quasi Isogonal Cubic *QL-Cu1*.**

- **For *X* on *QA-Cux* the images *QA-Tf4(X)* wrt the quadrangle and *QL-Tf1(X)* wrt *U.V.U^.V^* are collinear with the pivot *P*.**

- ***QA-Cux* is always unipartite: Pivot *P* and *QA-P4* are the Isogonal conjugated Newton Pair of Points *QL-2P2* of *U.V.U^.V^*.**

- **For points *X* (≠ *P*, *P**, *QA-P4*) on *QA-Cux* the quadrigon *X.X*.X^.X^** (with diagonal crosspoint *QA-P4*) has *QA-Cux* as its *QL-Cu1*.**



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