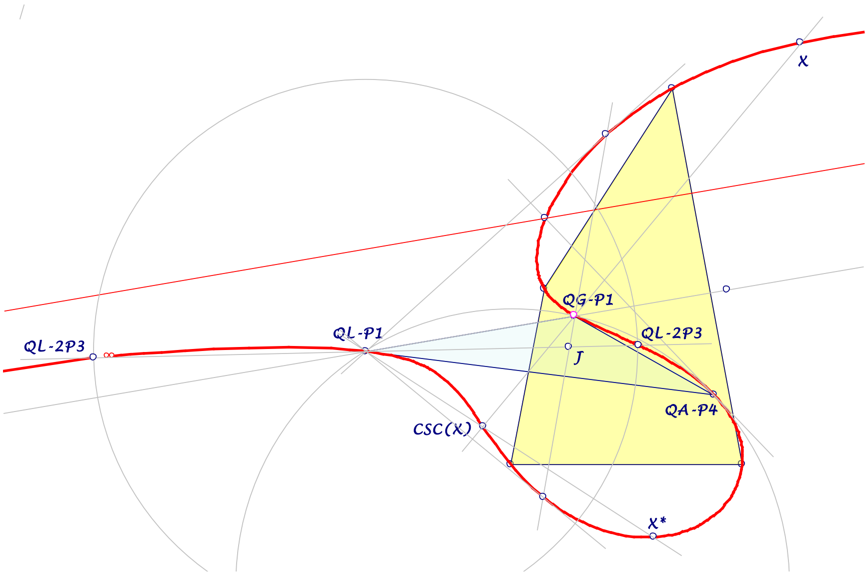
EQF-Note 2017-03-21

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

QG-Circumcubic wrt *QG-P1, QL-P1, QA-P4*

This is a cooperation of QG-, QL- and QA-geometry: A CSC- invariant circumcubic of a quadrigon through the points QG-P1, QL-P1, QA-P4 and the CSC-fixed points QG-2P3.



In *QFG*-message *1237* pivotal *CSC*-cubics for quadrilaterals are described:

- **A pivotal *CSC*-cubic is the locus for intersections of lines *L* through a pivot *P* and the circles *CSC(L)*.**

Here the special *CSC*-cubic *QG-Cu* is researched for a quadrigon (see figure above)

… with pivot *QG-P1*.

- ***QG-Cu* is a *CSC*-invariant *QG*-circumcubic bearing**
  … *QG-P1, QL-P1, QA-P4 = CSC(QG-P1)*
  … and the fixed points *QL-2P3* of *CSC*.

- ***QG-Cu* is isogonal (*) invariant wrt the reference triangle *QG-P1.QL-P1.QA-P4*.**

- **For *X* on *QG-Cu* holds**
  … *X, CSC(X), QG-P1* are collinear,
  … *X*, CSC(X), QL-P1* are collinear,
  … midpoints of *X.X lie on *QG-P1.QL-P1*.**

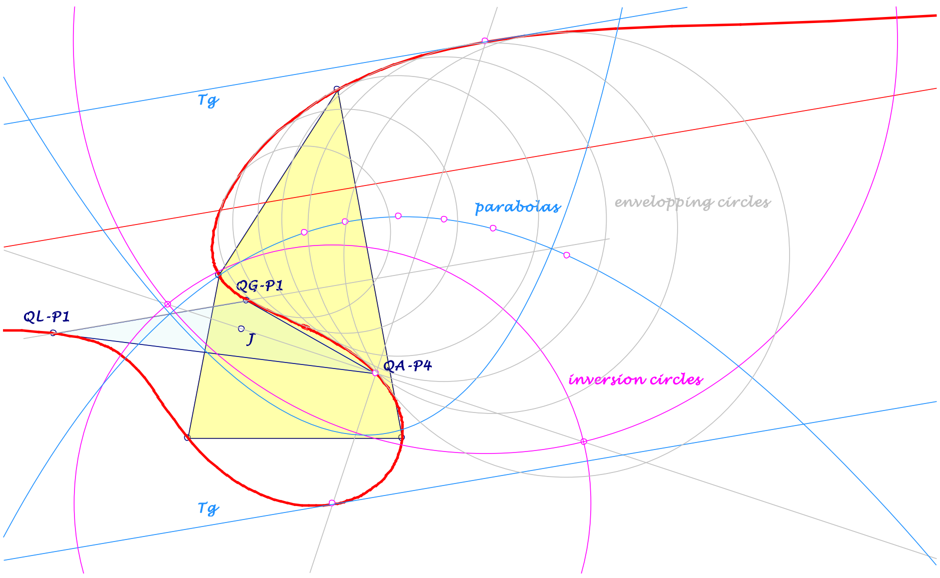
- **Tangent in *QG-P1* to *QG-Cu* is *QG-P1.QA-P4*,**
  … tangent in *QL-P1* to *QG-Cu* is *QL-P1.QA-P4*,
  … tangent in *QA-P4* to *QG-Cu* is the tangent in *QA-P4* at the circumcircle of the reference triangle,
  … tangents in *QL-2P3* at *QG-Cu* intersect in *QG-P1*.

- **Asymptote of *QG-Cu* is a parallel of *QG-P1.QL-P1***
  … through the reflection of *QA-P4* in *QG-P1.QL-P1*,
  … bearing the tangential of *QA-P4*.

- ***CSC*-partner on *J.QG-P1* (*J* incenter of the reference triangle) are points on *QG-Cu***
  … with tangential *QL-P1*.

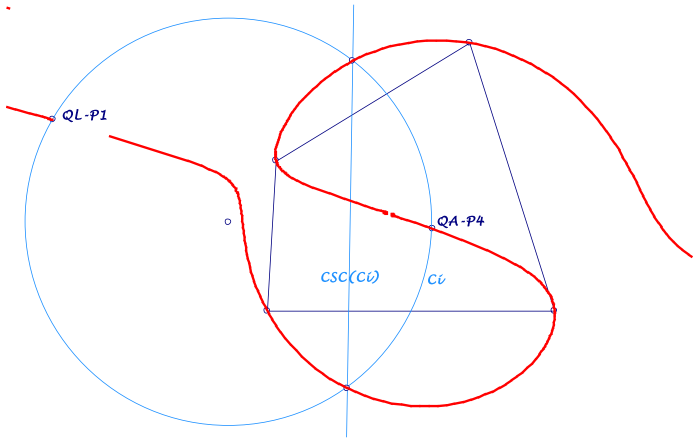
- ***QG-Cu* is a nonpivotal isocubic**
  … with reference triangle *QG-P1.QL-P1.QA-P4*,
  … isogonal isoconjugation
  … and root in the midpoint of *QG-P1.QL-P1*.

- ***QG-Cu* is anallagmatic …**
  … with two inversion circles,
  … one *CSC*-image of the other,
  … intersecting orthogonal on the angle bisector at *QA-P4*,
  … centered on *QG-Cu* in the intersections with the ex-angle bisector at *QA-P4*,
  ... which have tangents *Tg* parallel *QG-P1.QL-P1*.



- **As anallagmatic curve *QG-Cu* is twice the envelope of circles,**
  … orthogonal wrt an inversion circle,
  … centered on a parabola
  … … with focus *QA-P4*
  … … and directrice *Tg* (see above).

- ***QG-Cu* is the locus for intersections of circles *Ci* through *QL-P1* and *QA-P4* and the lines *CSC(Ci)*.**



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