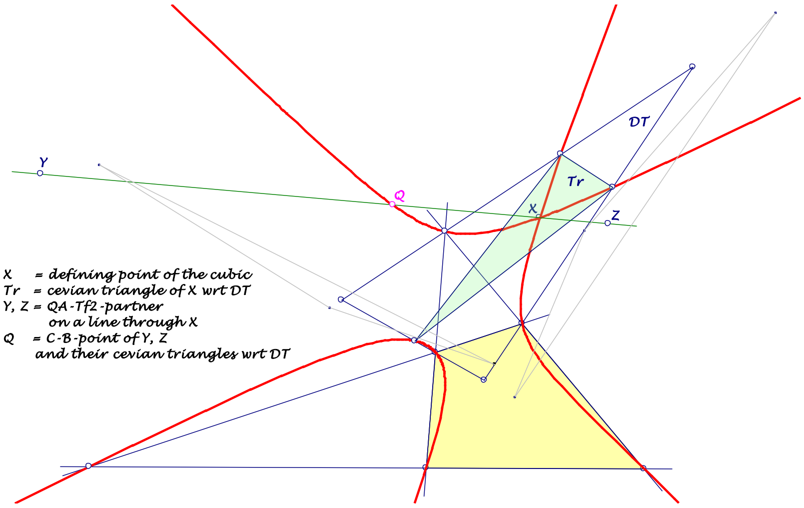
EQF-Note 2017-09-22

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

New *QL*-circumscribed Cubics

There is only the cubic QL-Cu1 in EQF, bearing the six QL-points. Here further nonpivotal isocubics with this property are researched, using the Cayley-Bacharach ninth point.

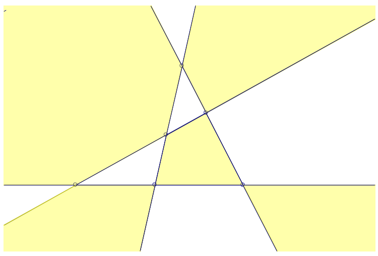


Definition of the cubic:

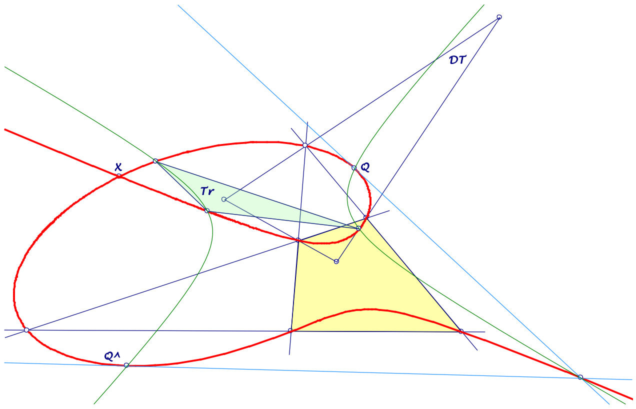
Consider a dual *QA/QL*-configuration with common diagonal triangle *DT*
… with a defining point *X* for the cubic,
… lines *L* through *X* with *QA-Tf2*-partners *Y* and *Z*
… and the *DT*-cevian triangles of *Y* and *Z*.
… The cubic is the locus of the Cayley-Bacharach ninth points *Q* of *X*, *Y* and the vertices of their cevian triangles.

Properties:

- **The cubic is *QL*-circumscribed through the six *QL*-points.**
- **The cubic has a double point in *X*, if *X* is a point in the marked *QL*-regions:**



- **The cubic is circumscribed the cevian triangle *Tr* of *X* wrt *DT*.**
- **The cubic is invariant wrt the *Tr*-isoconjugation ^ with fixed point *X*.**
- **The *Tr*-isoconjugation ^**
  … has further fixed points in the *DT*-vertices
  … and swaps opposite *QL*-points.
- **A special point Q_0 on the cubic is the *CB*-point of *X*, *QA-Tf2(X)* and the vertices of their *DT*-cevian triangles.**
- **Isoconjugated points *Q* and *Q*^ on the cubic and the six *QL*-points have their *CB*-point on the cubic**
  … in the intersection of their tangents,
  … which is the 6th intersection of the cubic and a *Tr*-circumscribed conic through *Q* and *Q*^.



- **The cubic intersects the *Tr*-sidelines in the common tangentials of opposite *QL*-points.**
- **The cubic is a nonpivotal isocubic**
  … with the *DT*-cevian triangle of the defining point *X* as reference triangle
  … and the isoconjugation ^ with fixed point *X*.

The **root** of this nonpivotal isocubic doesn´t lie on the cubic, it can be constructed with the circle *Γ* as described by Bernard Gibert (*EQF*: *Ref [17b], 1.5.6*).
The circle *Γ* bears the defining point *X*
… and is centered on *QL-L2* in the radical center
… … of the circle with diameter $Q_0.Q_0$^
… … and circles with diametral points in opposite *QL*-points.

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