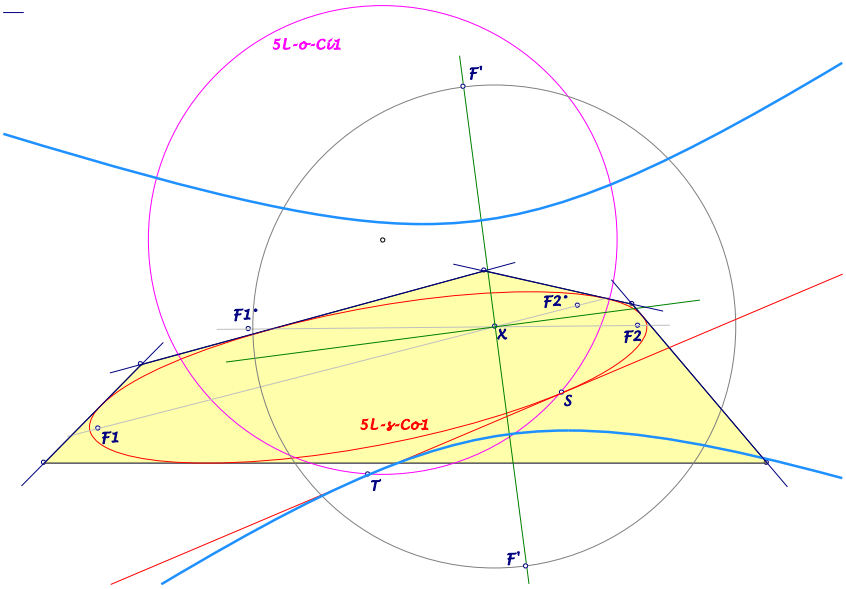
**EQF-Note 2017-11-06**

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

## 5L-Example for Polarity with Conic

*"According to Von Staudt, a conic corresponds to a polarity": This is discussed in QFG, started by Tsihong Lau QFG#2680. In QFG#2683 there are two 5L-transformations Tf3(P), Tf4(L), which define a polarity. Here a construction of the corresponding conic is described.*




If we have a look in *QFG#2683* and take the transformation …

***Tf0*** ***point → circle***: The 5 *CSC*-images of a point *P* wrt the *4L* of a *5L* are concyclic on the circle *Tf0(P)*.

… we get two further transformations

***Tf3*** ***point → line:*** *Tf3(P)* is the radical axis of *Tf0(P)* and *5L-o-Ci1* (see *QFG#790*).

***Tf4*** ***line → point:*** Common point of the radical axes for the *Tf0*-circles of the points of the line (see *QFG#790*).

… which give a bijection between points and lines, that preserves the incidence relation. The corresponding conic can be constructed as follows:

- Center of the conic is the point *X* (see *QFG#2669*)
  $$\boldsymbol{X = F_1F_2^\circ \cap F_1^\circ F_2}.$$
  $F_1$ and $F_2$ foci of the inscribed conic *5L-s-Co1*,
  $F_1^\circ$ and $F_2^\circ$ inverses of $F_1$ and $F_2$ wrt *5L-o-Ci1*.

- Main axis is the angle bisector of $<F_1XF_2$.

- Foci $F'$ are the intersections of the main axis and a circle round *X* with radius $\sqrt{X.F_1 \times X.F_2}$ .
- Special points *T* of the hyperbola (not always real):
  … Let *S* be an intersection of *5L-s-Co1* and *5L-o-Ci1*,
  … *Tg* the tangent in *S* at *5L-s-Co1*,
  … *T* second intersection of *Tg* and *5L-o-Ci1*.

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