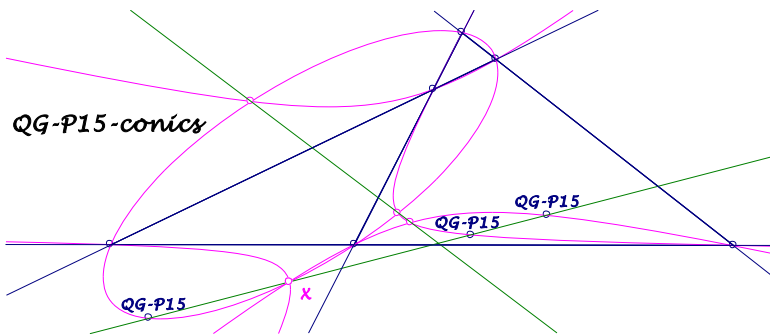


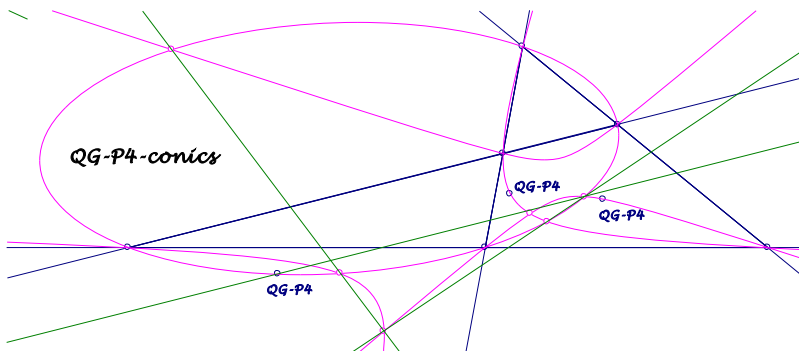
Background for these notes is:
 Chris van Tienhoven: Encyclopedia of Quadri-Figures
<http://chrisvantienhoven.nl/>

Three QG-Circumconics for a Quadrilateral II

Here another aspect is worked out as in EQF-Note 2013-11-04. We consider circumconics of quadrilaterals through a fixed quadrigon point $QG-Px$. For a quadrilateral there are three of these conics. We discuss the cases, that these conics have a common point. – Reference triangle for barycentric coordinates is $QL-DT$.



For quadrilaterals we consider circumconics through a fixed quadrigon point $QG-Px$. For the QG -components of a quadrilateral there are three of these $QG-Px$ -conics, each containing four of the six QL -points. In pairs they have four intersections: two QL -points and two further (not always real) intersections. So there are six further intersections on four lines defining a new quadrilateral (see figure below).



In the following only examples are worked out, where three intersections of the conics coincide (see first figure):

If the three points $QG-Px$ for a quadrilateral are collinear, the three $QG-Px$ -conics have a common point (collinear with the three $QG-Px$) and three further collinear intersections.

QG-P2

The common point of the three *QG-P2*-conics is the point at infinity of the Newton-Line *QL-L1*:

$$X(m^2 - n^2 : n^2 - l^2 : l^2 - m^2).$$

The three further intersections lie on the *M3D* Line *QL-L9*.

QG-P12

The common point of the three *QG-P12*-conics is the *QL*-Harmonic Center *QL-P13*.

The three further intersections lie on a parallel to *QL-L9* through *QL-P19*.

QG-P15 (see first figure)

The common point of the three *QG-P15*-conics is the intersection of *QL-L9* and *QL-P8*.*QL-P13*:

$$X(m^2n^2(m^2n^2 - l^4) : n^2l^2(n^2l^2 - m^4) : l^2m^2(l^2m^2 - n^4)).$$

The three further intersections lie on a line with the equation

$$(m^2n^2 + l^4)x + (n^2l^2 + m^4)y + (l^2m^2 + n^4)z = 0,$$

containing the intersection of *QL-L9* and its *QL-Tf2* image.

QG-P16

The common point of the three *QG-P16*-conics lies collinear with the *QG-P16*-points and *QL-P26* on the *QL-Tf1* image of the Dimidium Circle *QL-Ci6*:

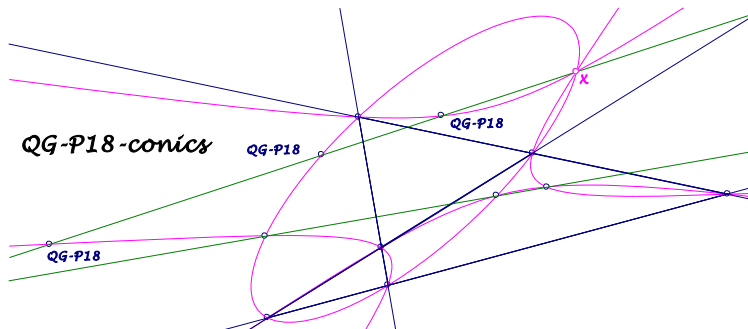
$$X(m^2n^2(a^2M + b^2L)(a^2N + c^2L)(a^2MN + (m-n)(b^2nN + c^2mM)) \\ (a^2MN + (m+n)(-b^2nN + c^2mM)) : \dots)$$

(only the first coordinate with $L = m^2 - n^2, M = n^2 - l^2, N = l^2 - n^2$).

QG-P18

The common point of the three *QG-P18*-conics lies collinear with the *QG-P18*-points on the *QL-Tf1* image of the *QL-DT* Medial Circle *QL-Ci2*:

$$X((m^2S_C^2 - n^2S_B^2)(l^2(S_B S_C + S^2) + S_A(m^2b^2 + n^2c^2)) \\ : (n^2S_A^2 - l^2S_C^2)(m^2(S_A S_C + S^2) + S_B(n^2c^2 + l^2a^2)) \\ : (l^2S_B^2 - m^2S_A^2)(n^2(S_A S_B + S^2) + S_C(l^2a^2 + m^2b^2))).$$



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