

EQF-Note 2013-01-05

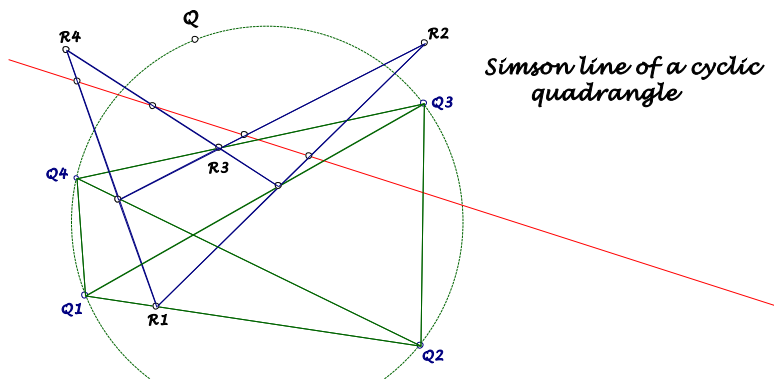
Background for these notes is:
Chris van Tienhoven: Encyclopedia of Quadri-Figures
<http://chrisvantienhoven.nl/>

Simson Lines in QL-Environment

For a point P on the circumcircle of a triangle we can consider the Simson line, containing the pedal points of P on the side lines of the triangle.

- For a quadrilateral the Miquel point $QL-P1$ is a point on the circumcircles of the component triangles. The belonging Simson lines of $QL-P1$ are always $QL-L3$.
- $QL-P1$ is a point on $QL-Ci2$, the nine-point circle of $QL-Tr1$, containing the midpoints of the $QL-Tr1$ sides. The corresponding Simson line is also $QL-L3$.
- The Simson line of $QL-P1$ wrt the orthic triangle of $QL-Tr1$ is a parallel to $QL-L3$.
- $QL-P1$ is a point on the Miquel circle $QL-Ci3$ containing the circumcenters O_i of the component triangles $L_jL_kL_l$. The Simson lines of O_i wrt $O_jO_kO_l$ concur in $QL-P5$ (Euler-Poncelet Point of $O_1O_2O_3O_4$).
- The Simson lines of $QL-P1$ wrt $O_jO_kO_l$ give a quadrilateral, homothetic to the reference quadrilateral wrt $QL-P1$ and factor $1/2$.
- The pedal line of $QL-P1$ wrt this homothetic quadrilateral is a parallel to $QL-L3$ half the distance to $QL-P1$ (railway watcher).

The last line can be considered in another way: There is an analogon of the Simson line for cyclic quadrangles (see [1], 05.1).



Let $Q_1Q_2Q_3Q_4$ be a cyclic quadrangle and Q a point on the circumcircle. Consider a quadrigon component of this quadrangle and the pedal quadrigon $R_1R_2R_3R_4$ of Q , then a second pedal quadrigon of Q wrt $R_1R_2R_3R_4$ degenerates collinear. For each quadrigon of the cyclic quadrangle this is the same line and shall be called the Simson line of the cyclic quadrangle.

- The Simson line of $QL-P1$ wrt the quadrangle $O_1O_2O_3O_4$ is a parallel to $QL-L3$ half the distance to $QL-P1$ (see above).
- This line is the $QL-Tf1$ image of a circle, touching $QL-Ci3$ in $QL-P1$ with four times the radius of the Miquel circle.

[1] <http://eckartschmidt.de>

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