

Rytz construction

This construction is used in case of conjugate diameters of an ellipse are known. This construction helps to find a major axis and a minor axis of the ellipse.

The conjugate diameters: The tangents at endpoints of one conjugate diameter are parallel to the other conjugate diameter.

Let's have conjugate diameters KL , MN of an ellipse and the centre S of this ellipse.

Rotate the longer diameter by 90 degrees around the centre S . We have a line segment SL' perpendicular to a line segment SL .

Connect points L' , M , mark this line q .

(the point M or N ?... select the point that is closer to the point L).

Construct a centre O of the line segment $L'M$. (Draw the same circles centred at points L' , M with an arbitrary radius. Connect their intersection points to get an axis l of the line segment $L'M$. The axis l and the line segment $L'M$ intersect at the desired centre O .)

Draw a circle k centred at the point O and passing through the point S .

This circle k and the line q intersect at points X , Y .

The lines passing through points X , S and Y , S are the axes of the ellipse. The major axis lies at an acute angle of the conjugate diameters.

The length of semimajor axis is the longer one of distances $|XM| = |YL|$, $|YM| = |XL|$. The length of semiminor axis is the shorter one of distances $|XM| = |YL|$, $|YM| = |XL|$.

Use the osculating circles and draw the ellipse.

