STUDY OF CONSTRUCTION BY QUADRATIC CURVE ADDITION METHOD

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Introduction

The quadratic curve addition method is a construction method that attempts to find the center of a circle by ***adding the locus of a quadratic curve*** to the drawing of a ruler and a compass.

The educational significance of the quadratic curve addition method : called the QCAM, is to find out where to put the focal point and the directrix of the quadratic curve in a given figure.

Example1 : In fig1, find the center point P by the QCAM.

fig1

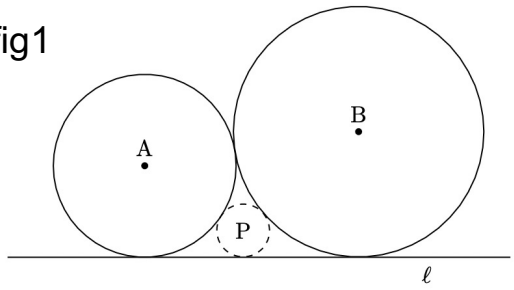
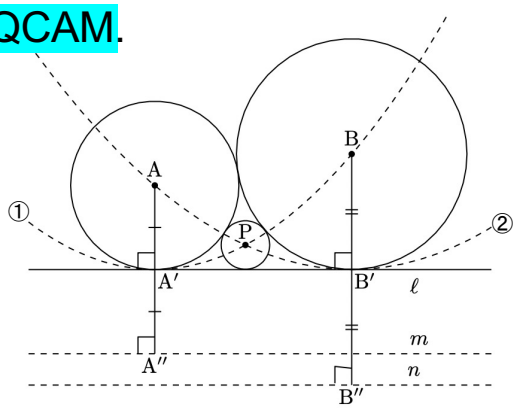


fig2



Answer: As shown in Fig. 2, the center of the circle P is the intersection of the parabola① with A as the focal point and *m* as the directrix and the parabola② with B as the focal point and *n* as the directrix.

Example2 : In fig3, find the center point Q and R by the QCAM.

fig3

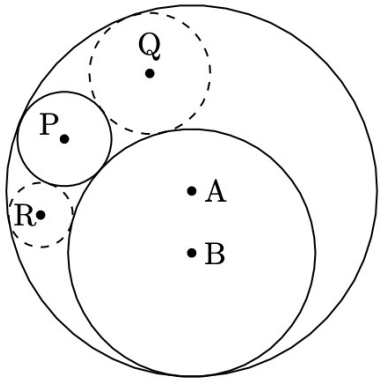


fig4

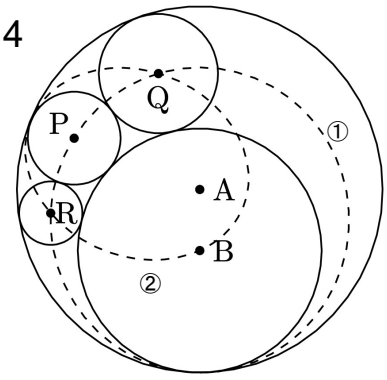
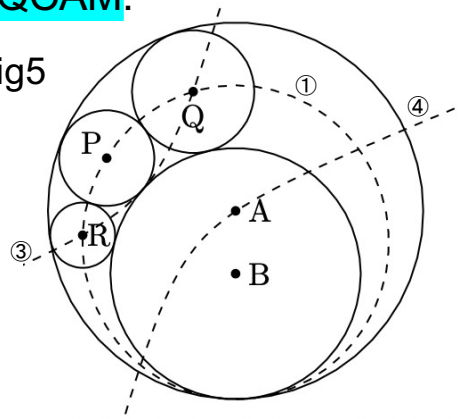


fig5



Answer: As shown in Fig. 4, The center of the circles Q and R is the intersection of the ellipse ① that focuses on A and B and the ellipse ② that focuses on P and A.

Another Solution: As shown in Fig. 5, The center of the circles Q and R is the intersection of the ellipse ① with A and B as the focal point and the hyperbola ③ with P and B as the focal point.

References

MAKISHITA, H. (2019). The problem of Apollonius which was solved by Geometric Construction and Loci of Quadratic Curves, Transactions of mathematical education for Kosen and University, 25(1), 66–86.