Five Problems about Circles Orthogonal to the Stevanovic circle

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Orthogonal circles are circles that cut one another at right angles. See [2]. From Weisstein [1]: “Amazingly, the Stevanović circle is orthogonal to nine other circles including: the Apollonius circle Bevan circle, circumcircle, excircles radical circle, nine-point circle, orthocentroidal circle and tangential circle.”

The computer program “Discoverer”, created by the authors, has discovered five new notable circles orthogonal to the Stevanovic circle. We present them below as problems.

Problem 1. Prove that the Stevanovic circle is orthogonal to the Circle having as its diameter the line segment connecting the Incenter and Mittenpunkt.

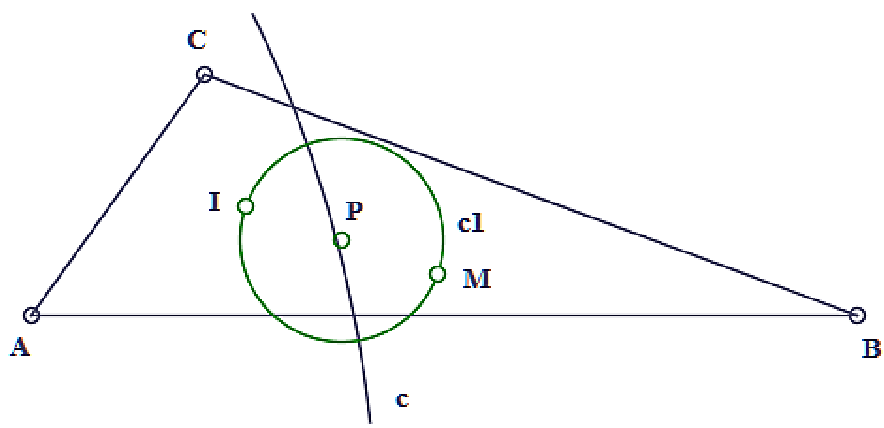

Fig. 1.

Figure 1 illustrates Problem 1. In Fig.1. *c* is the Stevanovic circle, *I* is the Incenter, *M* is the Mittenpunkt, *c1* is the Circle having as its diameter the line segment connecting the Incenter and Mittenpunkt. Then the circles *c* and *c1* are orthogonal.

Problem 2. Prove that the Stevanovic circle is orthogonal to the Brocard Circle of the Antimedial Triangle of the Excentral Triangle.

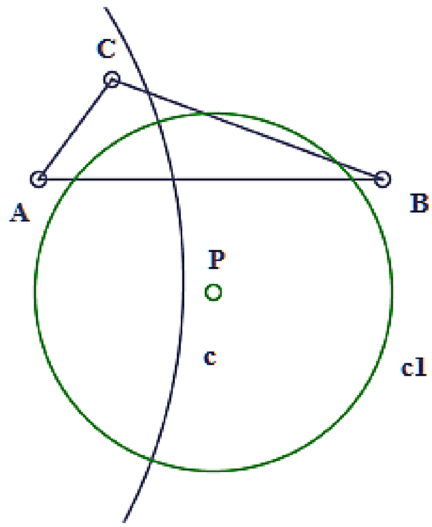

Fig. 2.

Figure 2 illustrates Problem 2. In Fig.2. *c* is the Stevanovic circle, *c1* is the Brocard Circle of the Antimedial Triangle of the Excentral Triangle. Then the circles *c* and *c1* are orthogonal.

Problem 3. Prove that the Stevanovic circle is orthogonal to the Antimedial Circle of the Euler Triangle of the Far-Out Point.

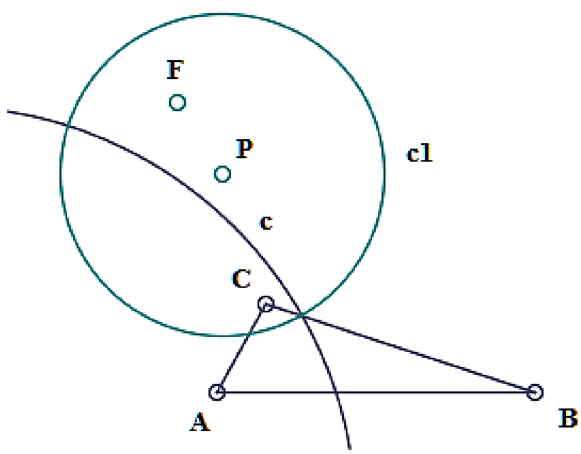

Fig. 3.

Figure 3 illustrates Problem 3. In Fig.3. *c* is the Stevanovic circle, *F* is the Far-Out Point, *c1* is the Antimedial Circle of the Euler Triangle of the Far-Out Point. Then the circles *c* and *c1* are orthogonal.

Problem 4. Prove that the Stevanovic circle is orthogonal to the Inverse Circle of the Excentral Circle in the Circumcircle.

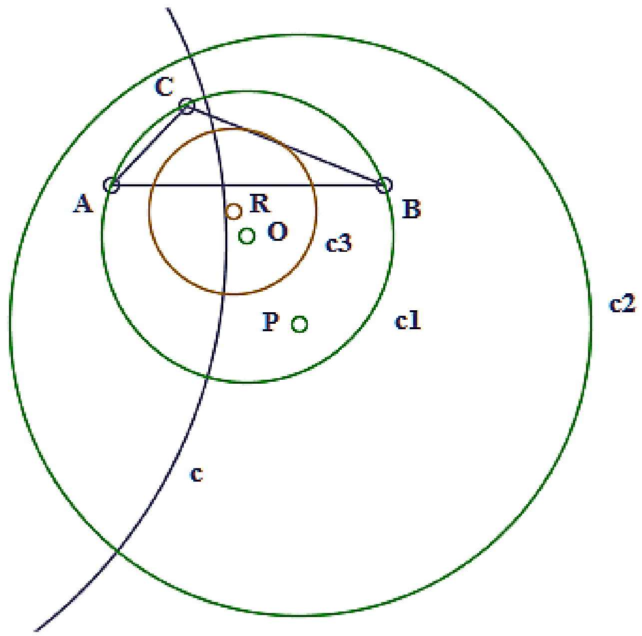

Fig. 4.

Figure 4 illustrates Problem 4. In Fig.4. *c* is the Stevanovic circle, *O* is the Circumcenter, *c1* is the Circumcircle, *P* is the Center of the Excentral Circle, *c2* is the Excentral Circle, *c3* is the Inverse Circle of the Excentral Circle in the Circumcircle. Then the circles *c* and *c3* are orthogonal.

Problem 5. Prove that the Stevanovic circle is orthogonal to the Image of the Circumcircle under the Homothety with Center the Far-Out Point and Ratio 1/2.

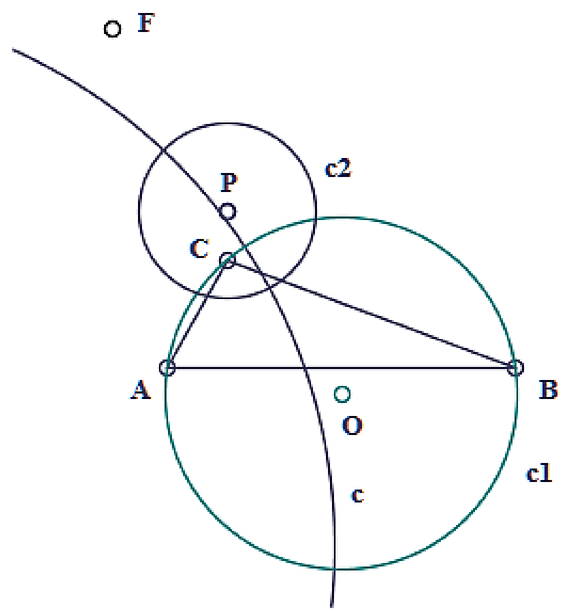

Fig. 5.

Figure 5 illustrates Problem 5. In Fig.5. *c* is the Stevanovic circle, *F* is the Far-Out Point, *O* is the Circumcenter, *c1* is the Circumcircle, *c2* is the Image of the Circumcircle under the Homothety with Center the Far-Out Point and Ratio ½. Then the circles *c* and *c2* are orthogonal.

References

[1] Weisstein, Eric W. "Stevanović Circle." From MathWorld - A Wolfram Web Resource. http://mathworld.wolfram.com/StevanovicCircle.html

[2] Weisstein, Eric W. "Orthogonal Circles." From MathWorld - A Wolfram Web Resource. http://mathworld.wolfram.com/OrthogonalCircles.html

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