Chapter V

Conclusion and Discussion

According to the results, it is obvious that the method prefers a symmetric considered set. Although the research did not prove or solve the problem directly in some case, it already gave us a lot of amazing results that may guide us to the solution of the problem in the future. Here are some examples of the results that lead us to something curiously.

Example 5.1 an equilateral triangle

When we considered $\Pi = P_2\ P_6\ P_1\ P_4\ P_{1b}\ P_5\ P_3$, the shortest polysegment is approximately 0.981981 units long. It is shown as the figure 5.1 below.

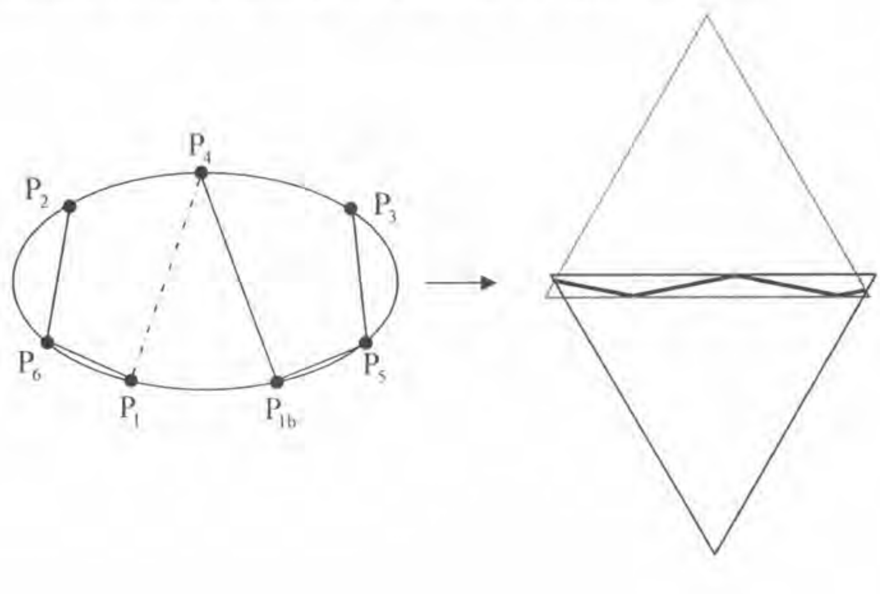

Figure 5.1 : An arc in Besicovitch Z-arc family obtained in the research

The arc in figure 5.1 has the same length of Besicovitch Z-arc. We had wondered why this arc was formed until P. Coulton and Y. Movshovich [6] discovered that it was a family of Besicovitch Z-arc in 2006.

Example 5.2 an isosceles right-angled triangle

When we consider $\Pi = P_1\ P_6\ P_2\ P_4\ P_{1b}\ P_3\ P_5$, the shortest polysegment is approximately 0.948683 units long. It is shown as the figure 5.2 below.

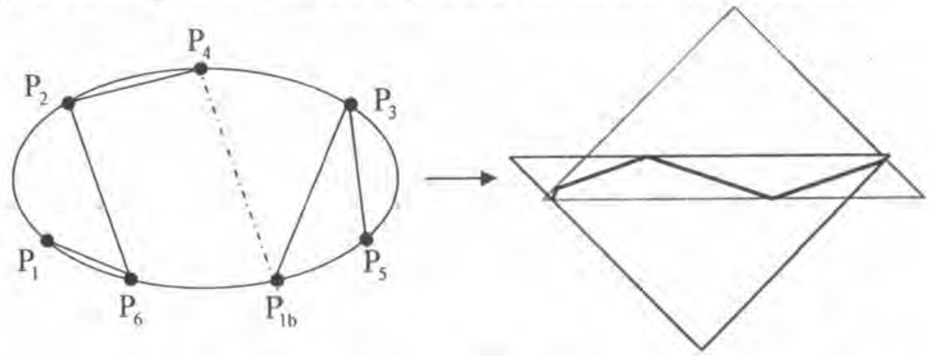

Figure 5.2 : An arc obtained from the research has the same length as Z- shaped three-segment polygonal arc.

Moreover, when we consider $\Pi = P_2\ P_6\ P_1\ P_4\ P_{1b}\ P_5\ P_3$, the shortest polysegment is approximately 0.948683 units long. It is shown as the figure 5.3 below.

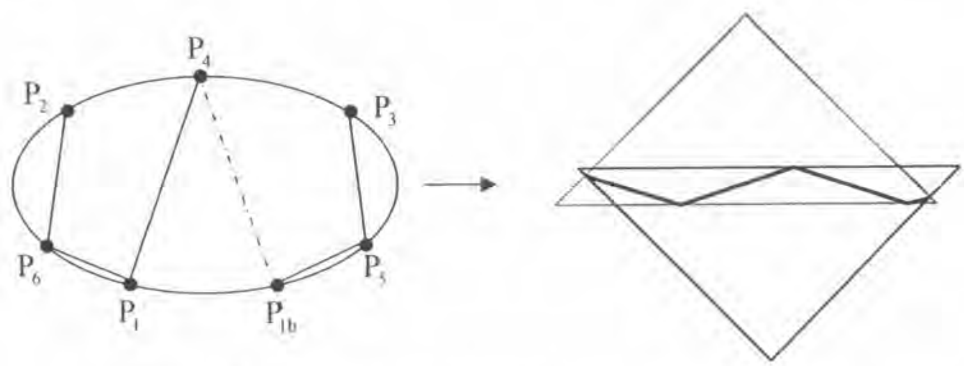

Figure 5.3 : Another arc obtained from the research has the same length as Z- shaped three-segment polygonal arc.

Figure 5.2 and 5.3 may lead us to the problem whether they are some of Z- shaped three-segment polygonal arc family.

Example 5.3 a $30^{\circ}-60^{\circ}-90^{\circ}$ triangle

When we consider $\Pi = P_2\ P_1\ P_6\ P_4\ P_{1b}\ P_5\ P_3$, the shortest polysegment is approximately 0.891853 units long. It is shown as the figure 5.4 below.

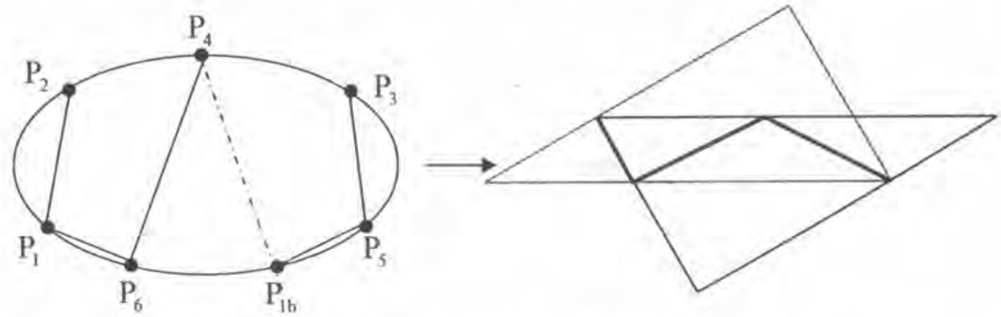

Figure 5.4 : An Z- shaped three-segment polygonal arc obtained from the research

Moreover, When we consider $\Pi = P_2\ P_6\ P_1\ P_4\ P_{1b}\ P_5\ P_3$, the shortest polysegment is approximately 0.866671 units long. It is shown as the figure 5.5.

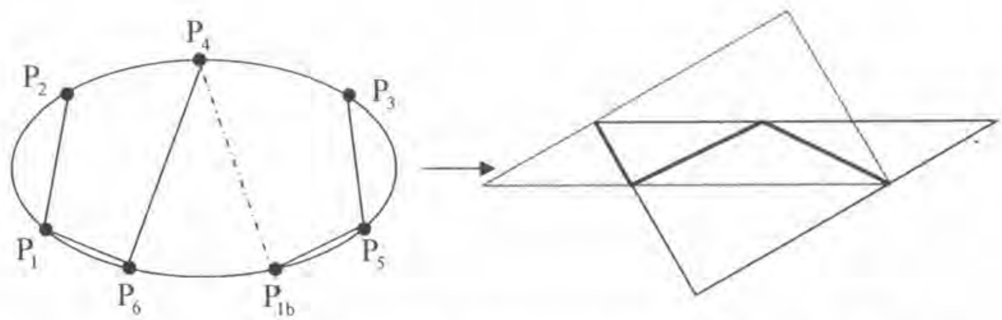

Figure 5.5 : Anthoer Z- shaped three-segment polygonal arc obtained from the research

This Z- shaped three-segment polygonal arc may make us wonder whether they are the shortest arc that can not be covered?

After we found that a $30^{\circ}-60^{\circ}-90^{\circ}$ triangle does not work well with 2 orientations, we tried to do it with more orientation. The following example in figure 5.6 was obtained when we did it with 6 orientations

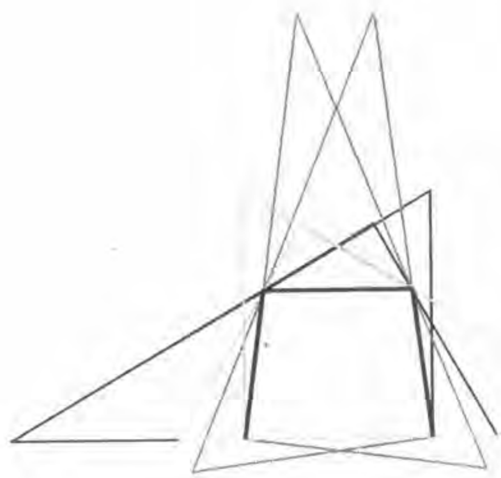

Figure 5.6 : An arc obtained from the research by Raywat Tanadkithirun. It may be our new conjecture about this cover.

The shortest polysegment is approximately 0.912047 units long which is a bit longer than our conjecture of a staple shaped three-segment polygonal arc of length $\frac{9}{(3+4\sqrt{3})} \simeq 0.906508$. This may lead us to reconsider about the conjecture again.

Although a lot of people don't think that the results from computer programming are reliable, it can not be denied that computer programming can help us a lot when we tried to do some researches. At least, they bring us to a good conjecture. The proof of 4-coloring theorem is a good example of opening your mind to accept that sometimes computer can give us a hand what we cannot do.