

**FILL THE GAP!**

**GeoGebra Action Package (GAP) for the ADVENTURES ON PAPER exercise book**

***Eleonóra Stettner: Möbius Strip and Frieze Symmetries***

**Exercise1:** Interesting features of Moebius strip, twisted strips and their limits (Stettner2.ggb)

The special features of various surfaces, like the Moebius strip and the twisted strips, that we can study best if we create their paper models. Some other features can be better observed by computer modeling. If we would like to make a wider strip, the paper gets crumpled. The wideness cannot be increased indefinitely with the paper models, but we can do this with computers. Moreover one can experiment with making self-secting strips as well.

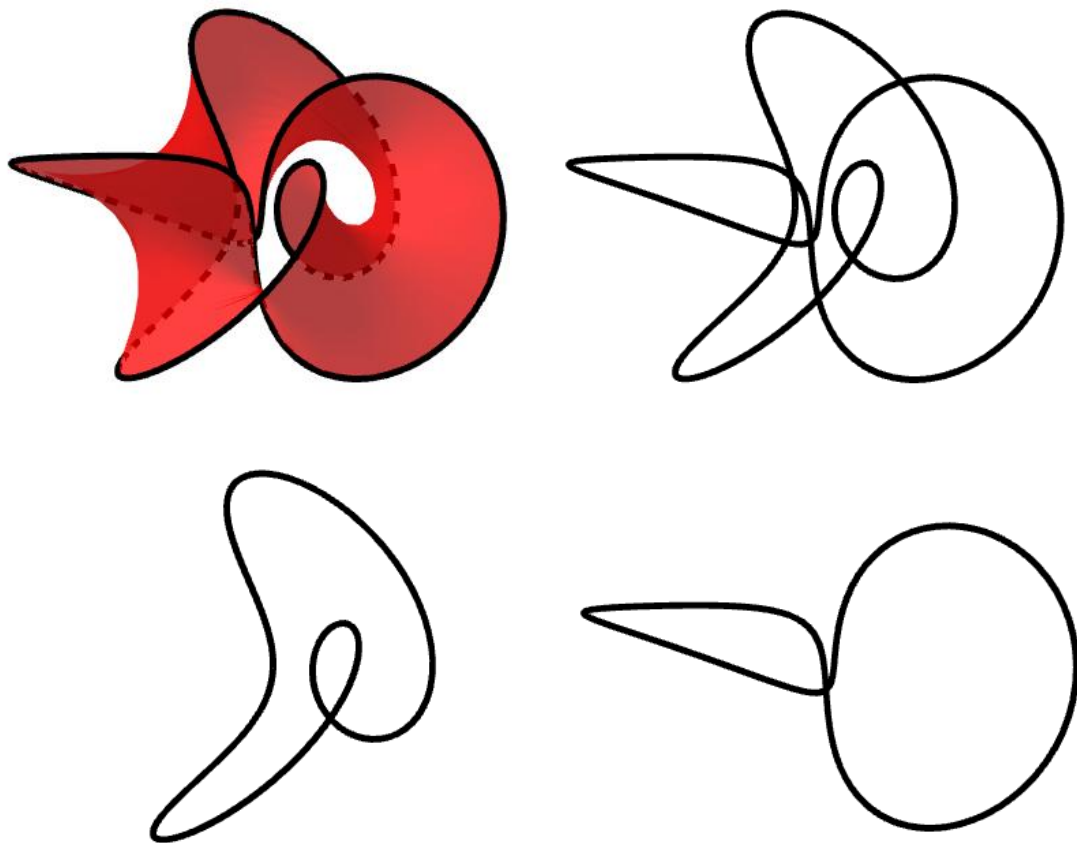


Figure 1: The limit of a 4-times twisted strip, 2 separate parts of the limit

The GeoGebra image consists of three parts. One of them is the surface. The limit of the surface consists of two parts. One of the sliders can change parameter 'b' which is the wideness of the surface. The other slider sets the number of the twists on the strip. Turn off the visibility of the surface, observe that the limit of the strip with odd number of twists makes a closed curve, opposite to the even times twisted strips' limit, which is made up by two separate closed curves.

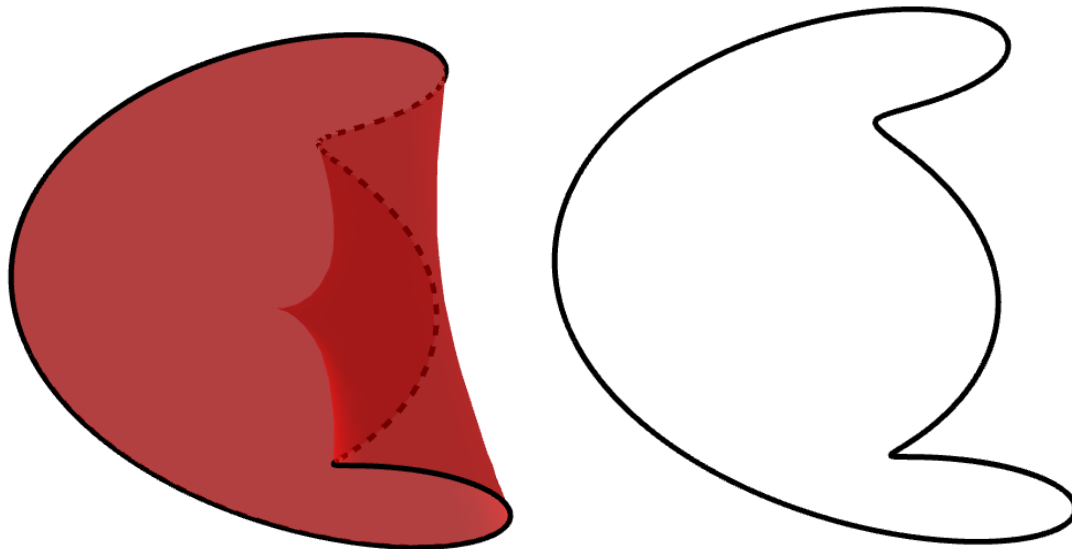


Figure 2: The Wide Moebius strip observed from an unusual perspective. It is clear that the limit of the strip is a single closed curve.

### Exercise2 (Stettner3.ggb)

GeoGebra is highly suitable to illustrate the isomorphism of graphs. Draw a Tietze-graph and transform it by the moving of the vertices. Make symmetric and asymmetric graphs.

The following figure shows some examples:

