

Reversing cube with slits

Naofumi Horio (Kumamoto Univ., Gyokunan junior high school)

Jin-ichi Itoh (Sugiyama Jogakuen Univ.)

Recently H. Maehara defined an origami-deformation of a polyhedral surface with boundary in Euclidean space, and he showed that every rectangular tube can be subdivided so that it becomes reversible (it is called s-reversible).

In this talk we discuss on the reversibility of regular polyhedral surface, especially cube, with several slits around vertices. In the case of cube and icosahedron, if we cut them along all edges around antipodal vertices, we get tubes, then they become s-reversible.

Theorem 1. Octahedron with slits is s-reversible (See Figure1.). Tetrahedron with slits is s-reversible (See Figure 2.). Cube with slits is s-reversible (See Figure 3.).

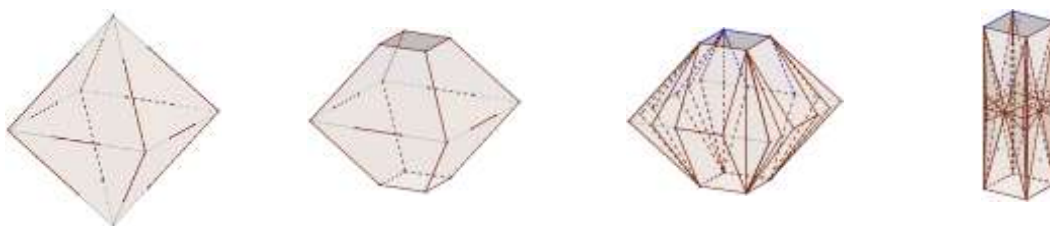


Figure 1.

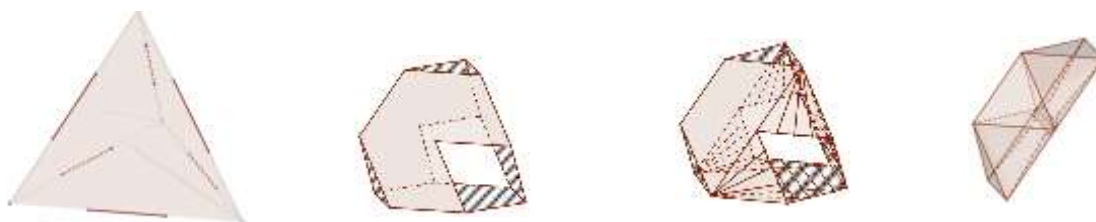


Figure 2.

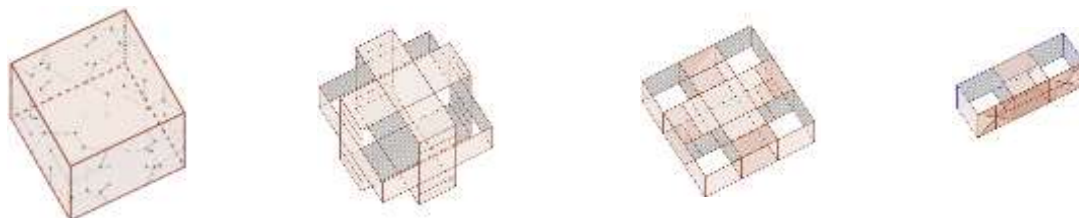


Figure 3.

The length of slit on the above cube is too long. We try to shorten the length of slit of cubes and get the following main result.

Theorem 2. Unit cube with slits of length $4 + \varepsilon$ is also s-reversible (See Figure 4.).

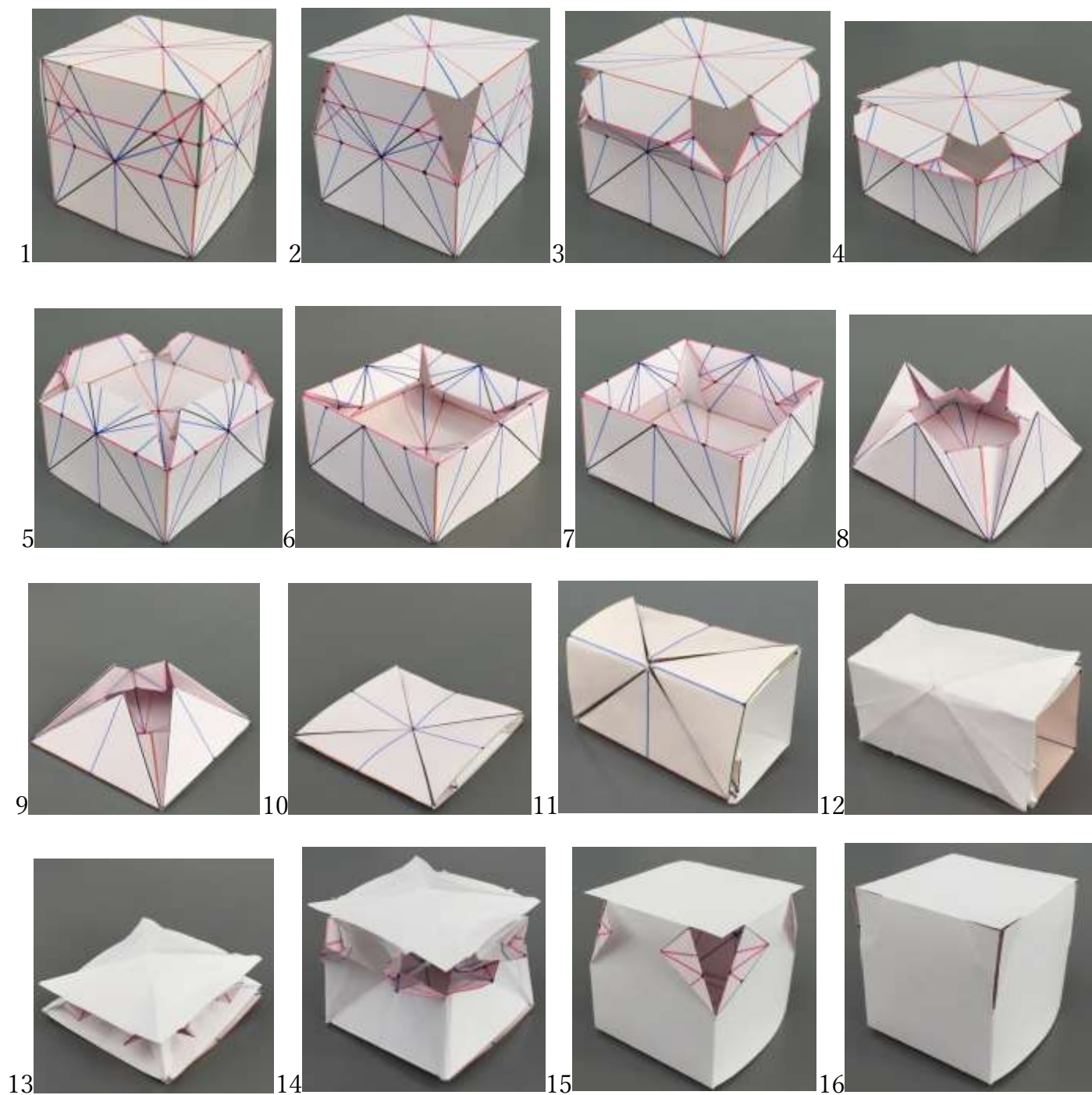


Figure 4.

Reference

- [1] H.Maehara, Reversing a polyhedral surface by origami-deformation, European J. of Comb. 31 (2010), 1171-1180