

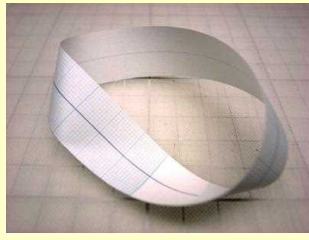
Cutting The Möbius Strip

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1 Introduction

If the Möbius strip is cut in half along the line, it turns into one large twisted ring.

What kind of strips appear when the strips, twisted (180 degrees=1twist) two to ten times, are cut?



2 Experiment

Make 20 strips with twists from one to ten times.

① Cut 10 strips along the line (one-half from the edge)

② Cut 10 strips along the line (one-third from the edge)

3 Result

table 1: Strips twisted odd number of times (cut one-half in from the edge)

Twists (before cutting)	Twists (after cutting once)	Numbers of strips(after cutting)	Features (after cutting once)
1	4	1	None
3	6	1	A knot
5	10	1	A knot
7	14	1	A knot
9	18	1	A knot

twice

table 2: Strips twisted even number of times (cut one-half in from the edge)

Twists (before cutting)	Twists (after cutting once)	Numbers of strips(after cutting)	Features (after cutting once)
2	2	2	Twined once
4	4	2	Twined twice
6	6	2	Twined 3 times
8	8	2	Twined 4 times
10	10	2	Twined 5 times

the same

table 3: Strips twisted odd number of times (cut one-third from the edge)

Twists (before cutting)1	Twists (after cutting once)	Numbers of strips(after cutting)	Features (after cutting once)
1	1and4	2	Twined once
3	3and6	2	Twined twice A knot
5	5and10	2	Twined 4 times A knot
7	7and14	2	Twined 8times A knot
9	9and18	2	Twined 16times A knot

twice

the same

table 4: Strips twisted even number of times (cut one-third from the edge)

Twists (before cutting)	Twists (after cutting once)	Numbers of strips(after cutting)	Features (after cutting once)
2	2	2	Twined once
4	4	2	Twined twice
6	6	2	Twined 3 times
8	8	2	Twined 4 times
10	10	2	Twined 5 times

the same

1/2

4 Future Research

The rules of cutting strips are found.

But for the strip, which is twisted once before cutting once and cut one-half or one-third of the way in from the edge, the result didn't follow the rule.

Why?

Reference

• Clifford A. Pickover : Möbius Strip, 日経BP社 2007
 瀬山士郎 著: はじめてのトポロジー, PHP研究所 2009