Global exercise - GUE10

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Content covered:

- ✓ Analysis: Surface integral
  1. Area
  2. Orientable surface
- ✓ Numerics: Optimization

1 Analysis: Surface integral

Example 1. *Examine the* ***Möbius band*** *given as follows*

$$\vec{\gamma} : (-1, 1) \times (0, 2\pi) \to \mathbb{R}^3$$

with

$$\vec{\gamma}(t, \phi) = \begin{pmatrix} \cos(\phi) \\ \sin(\phi) \\ 0 \end{pmatrix} + \frac{t}{2} \begin{pmatrix} \cos(\phi)\cos(\phi/2) \\ \sin(\phi)\cos(\phi/2) \\ \sin(\phi/2) \end{pmatrix}.$$

Show that this surface is ***not orientable****.*