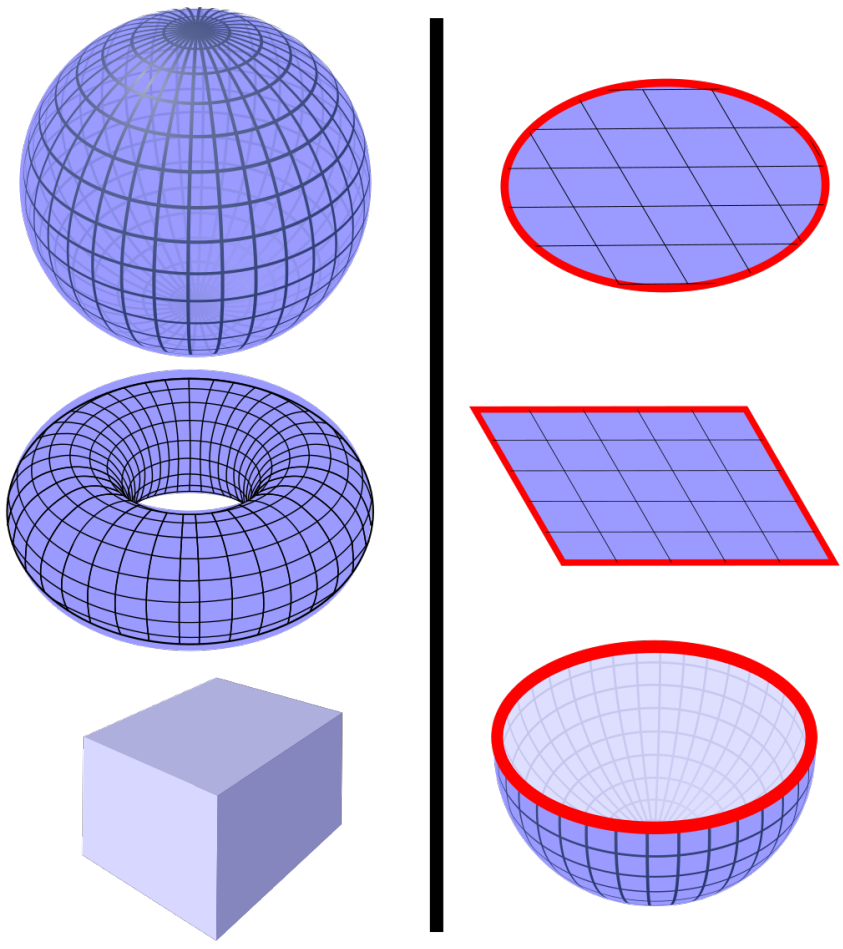
What is...a Seifert surface?

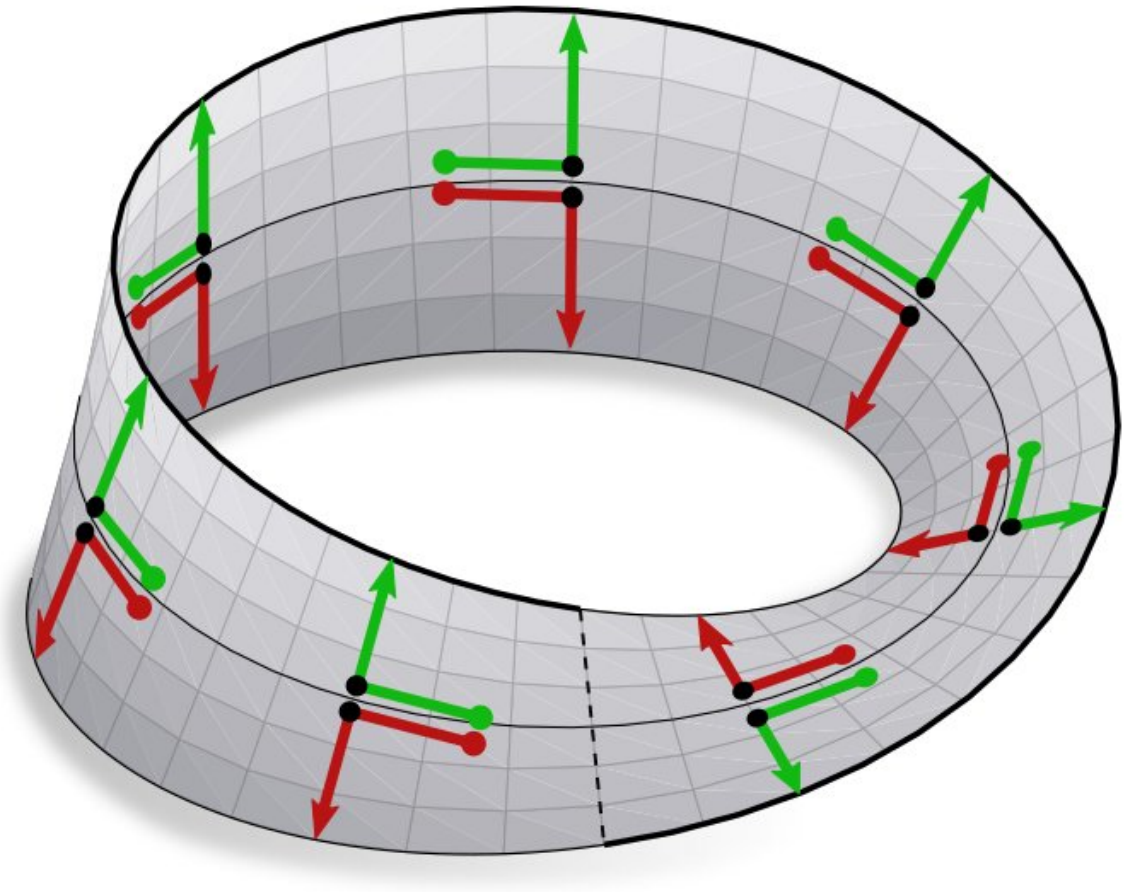
Or: Soap and knots

Surfaces in topology



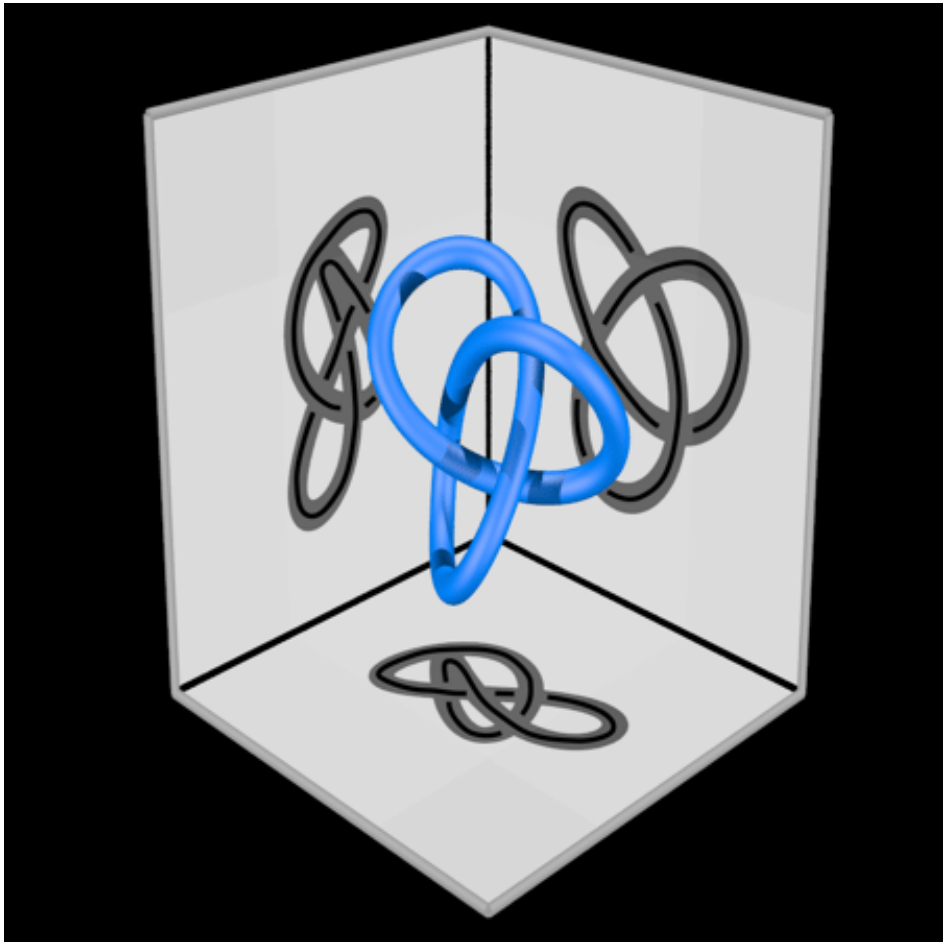
- A surface looks locally like a plane
- We consider surfaces up to continuous deformations
- Example Torus=coffee mug

Please not the Möbius strip



- Orientability of a surface is a consistent choice of a coordinate system per point
- There are non-orientable manifolds
- We only want orientable surfaces

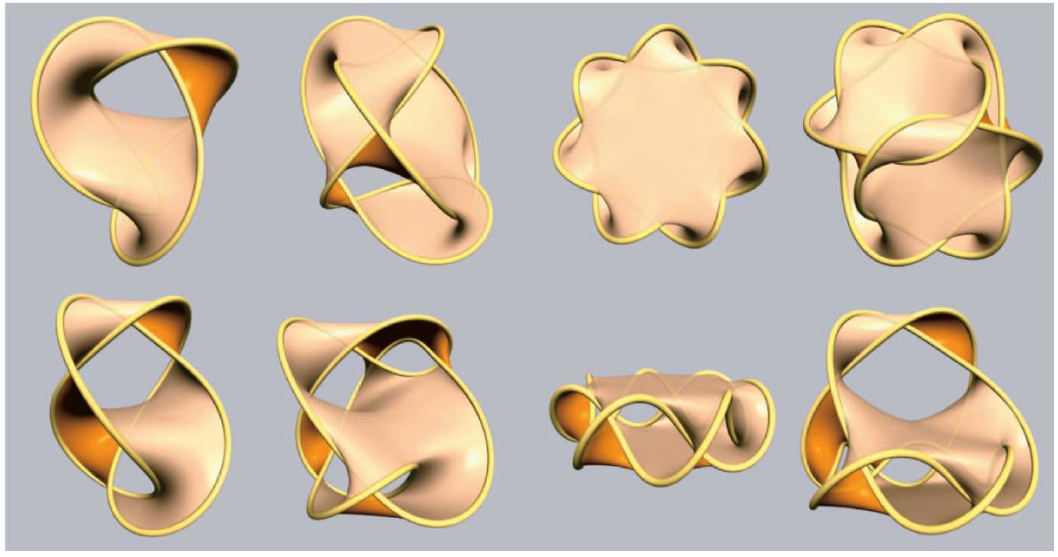
Seifert's question



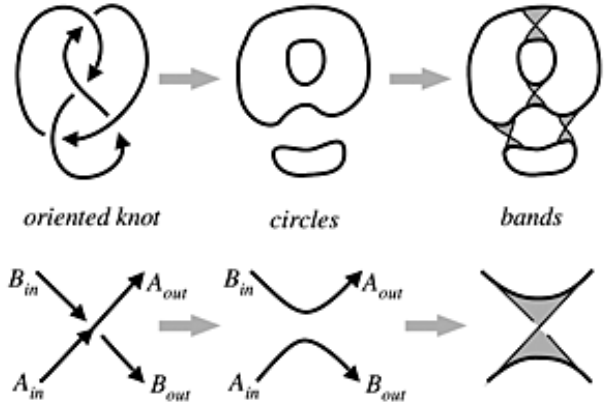
- Task Associate a surface S to a knot/link K that only depends on the knot/link
- S should be orientable with boundary K
- S should be of minimal genus

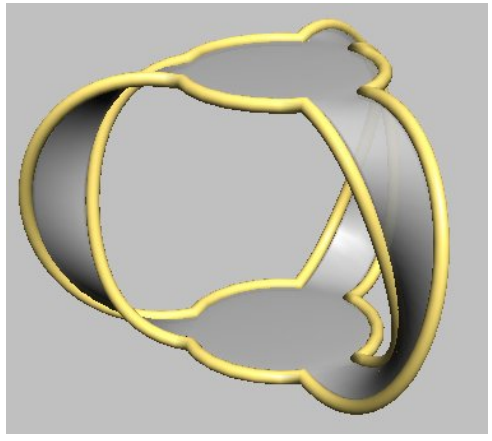
Enter, the theorem

Seifert surfaces exist



Seifert surfaces can be constructed algorithmically:





Seifert and soap

- Seifert surfaces are minimal surfaces
- Minimal surfaces arise via soap films
- Thus, Seifert surfaces arise as soap films

Thank you for your attention!

I hope that was of some help.