UNRAVELING OF A KNOTTY MYSTERY

Ekaterina Vlasiuk, 785

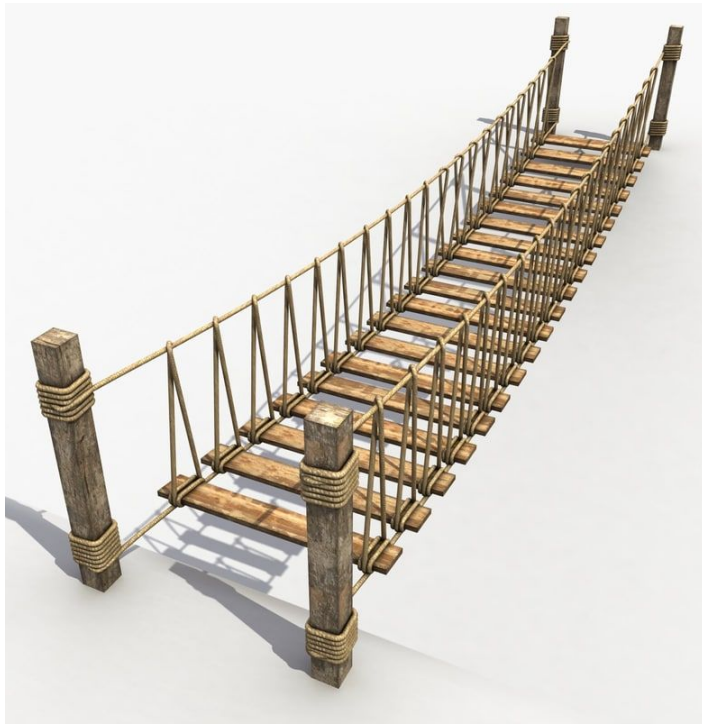
PLAN

- Diving into the problem
- Mathematical model of knots
- Experiment with color-changing fibers
- Results and the application

DIVING INTO THE PROBLEM

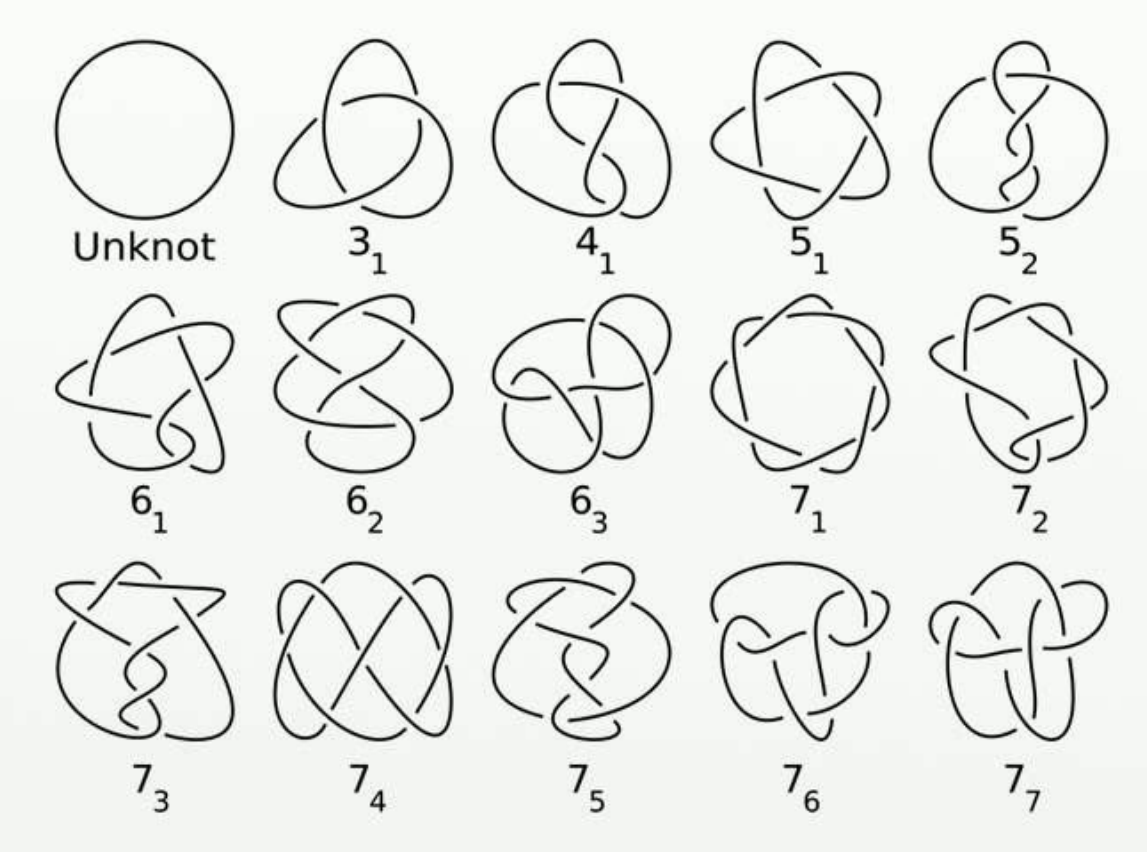
https://www.vecteezy.com/free-vector/mountain-drawing?page=4

https://www.dreamstime.com/illustration/dream-team.html?pg=7



https://www.freepng.ru/png-huluqb/

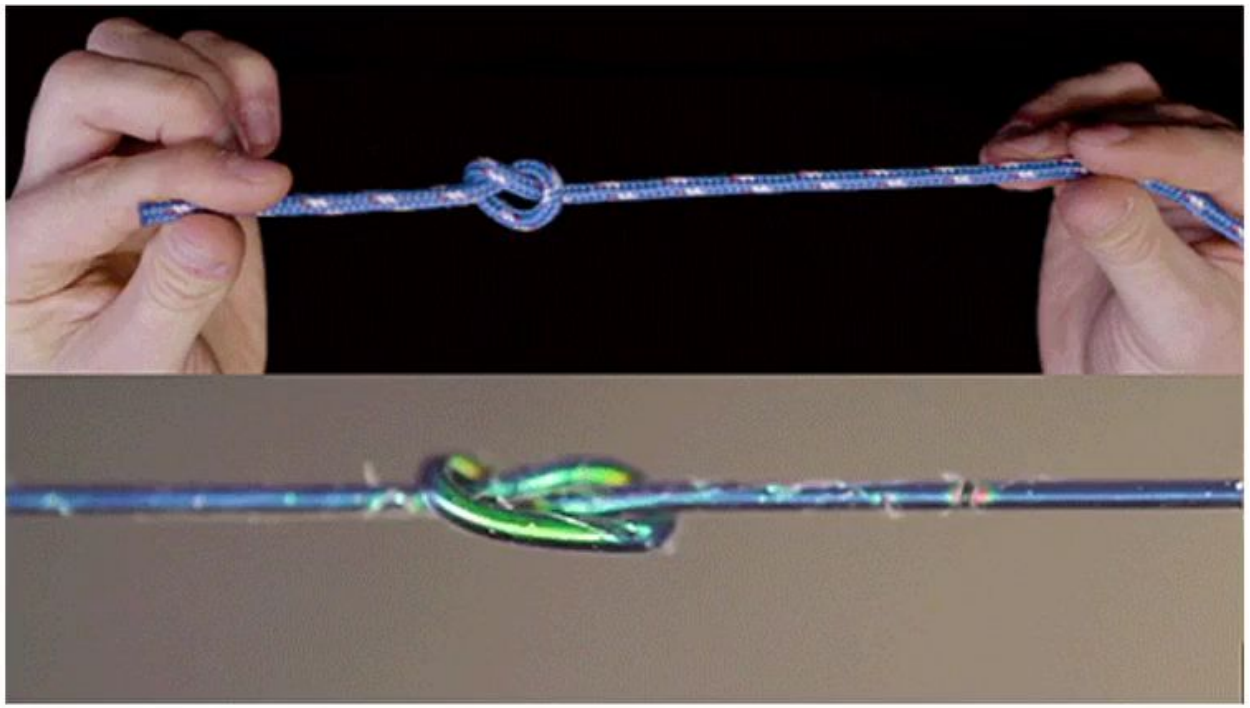
MATHEMATICAL MODEL



A table of prime knots up to seven crossings

https://en.wikipedia.org/wiki/Knot_theory

COLOR-CHANGING FIBERS



http://news.mit.edu/2020/model-how-strong-knot-0102

Trefoil knot, partially tightened

https://www.scientificamerican.com/article/color-changing-fibers-unravel-a-knotty-mystery/

RESULTS

Conditions of knots' stability:

- a higher number of crossing points of two strands in contact
- rotation of strand segments at neighboring crossing points in different directions
- sliding of strands tangentially against each other

Zeppelin knot

Alpine butterfly knot

http://www.climbing.ru/media/all_2_2_1360/section_23_1_2_21/item_5433/

SUMMARY

- Comprehension of the problem
- Knot theory

- Experiment with color-changing fibers

- Results and the application

Thank you for your attention!