

UNRAVELING OF A KNOTTY MYSTERY

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PLAN

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



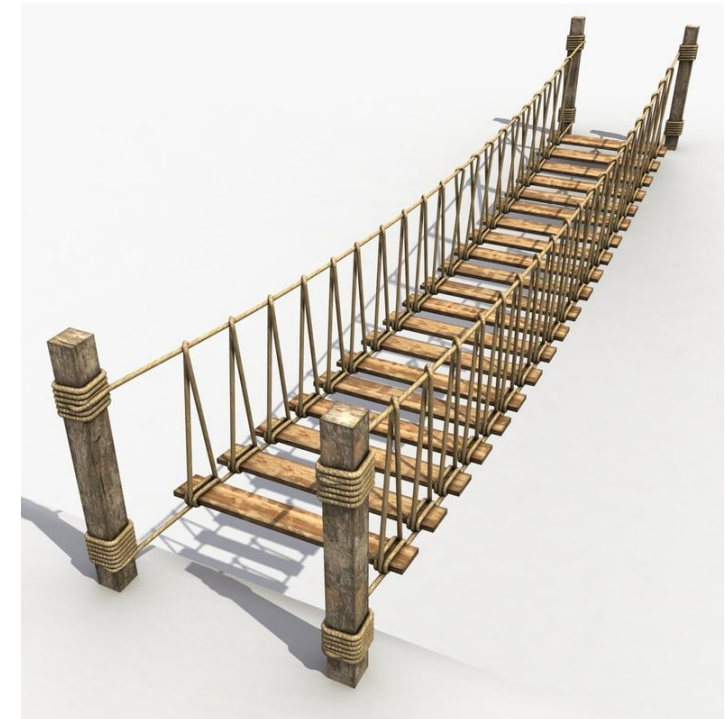
DIVING INTO THE PROBLEM



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



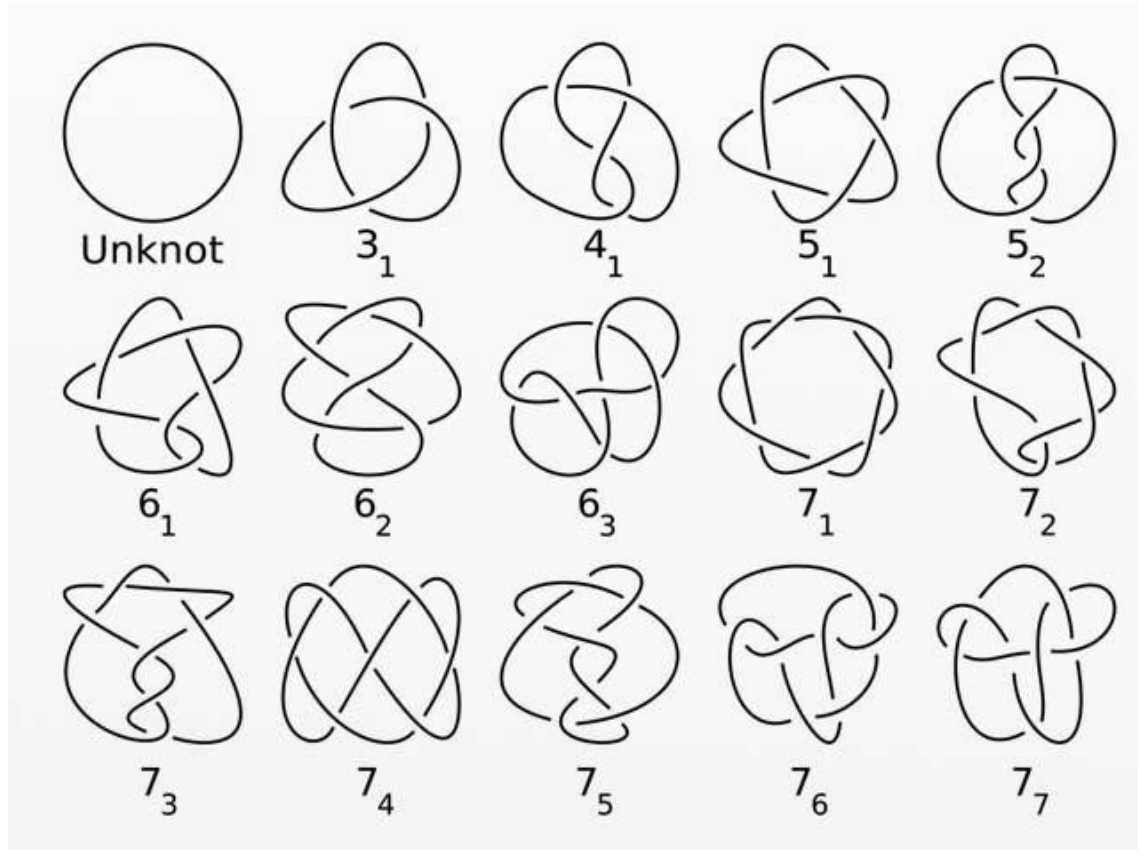
<https://www.dreamstime.com/illustration/dream-team.html?pg=7>



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



MATHEMATICAL MODEL

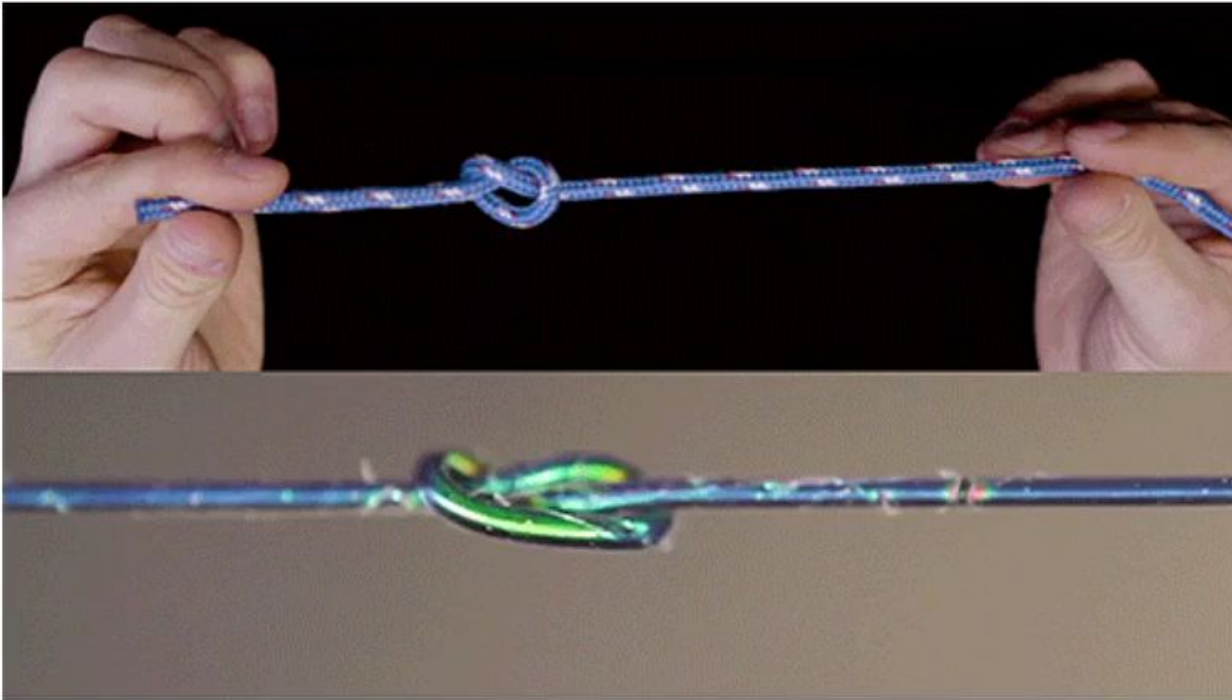


A table of prime knots
up to seven crossings



COLOR-CHANGING FIBERS

Trefoil knot, partially tightened



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

<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



SUMMARY

- Comprehension of the problem
- Knot theory
- Experiment with color-changing fibers
- Results and the application



Thank you for your attention!

