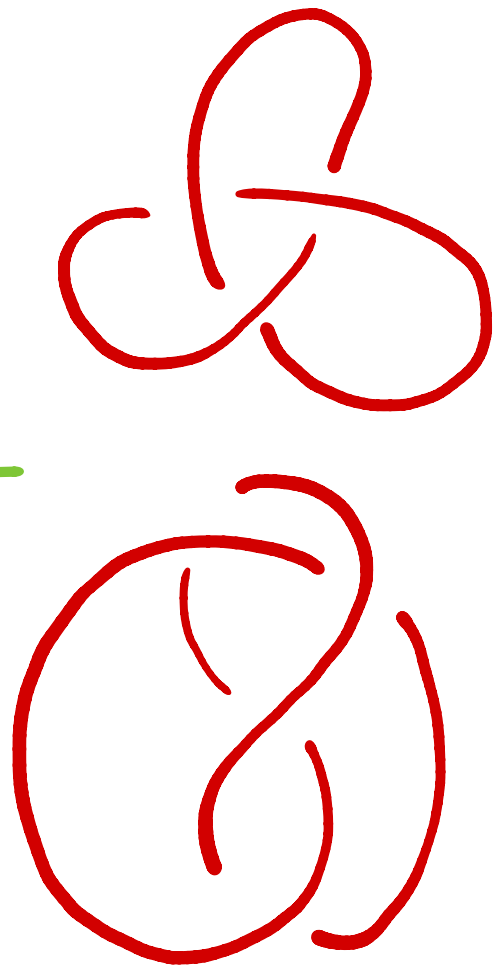


LOW DIMENSIONAL TOPOLOGY

VERA VÉRTESI



KNOT



QUESTION : CAN YOU UNTIE IT ?

I.E. : CAN YOU MOVE IT AROUND IN SPACE

W/O CUTTING OR GLUEING TO EVENTUALLY
OBTAIN



KNOT

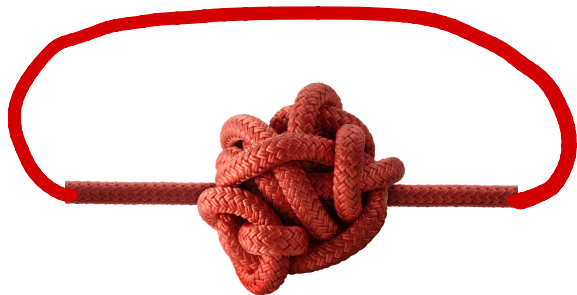


QUESTION: CAN YOU UNTIE IT ?

I.E.: CAN YOU MOVE IT AROUND IN SPACE
W/O CUTTING OR GLUEING TO EVENTUALLY
OBTAIN

ANSWER: YES : JUST DO THE TYING PROCESS
BACKWARDS

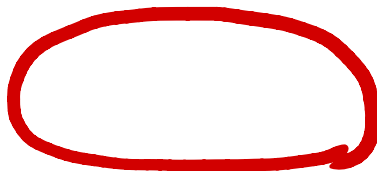
KNOT



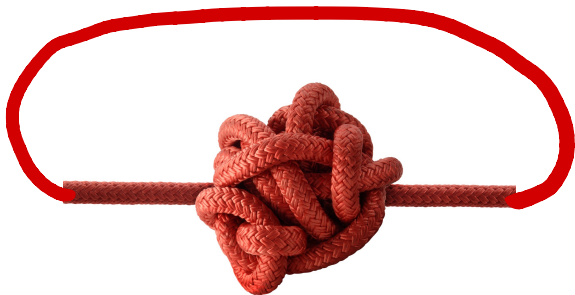
QUESTION: CAN YOU UNTIE IT ?

I.E.: CAN YOU MOVE IT AROUND IN SPACE

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OBTAIN

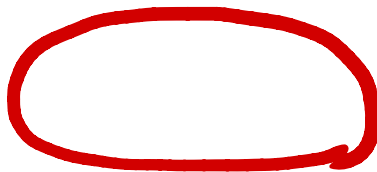


KNOT

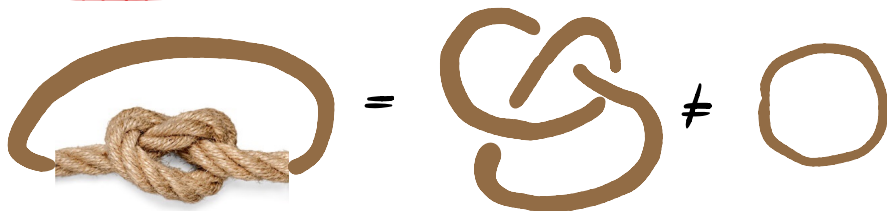


QUESTION: CAN YOU UNTIE IT ?

I.E.: CAN YOU MOVE IT AROUND IN SPACE
W/O CUTTING OR GLUEING TO EVENTUALLY
OBTAIN



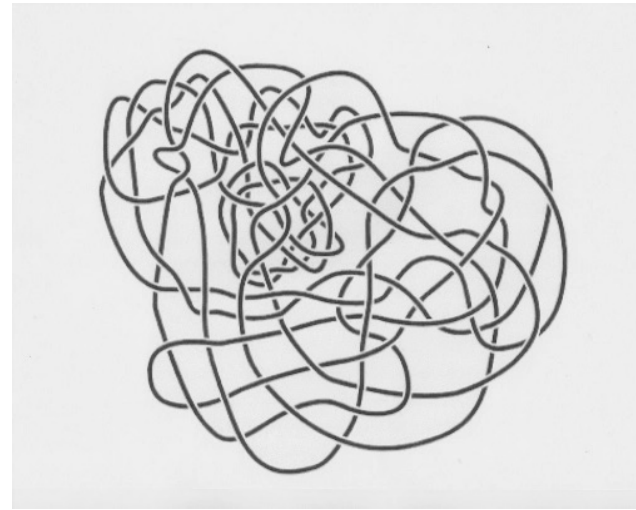
ANSWER: NOT SURE !



ALGORITHMS, INVARIANTS

GIVEN : KNOT

QUESTION : CAN YOU UNTIE IT ?



ALGORITHMS, INVARIANTS

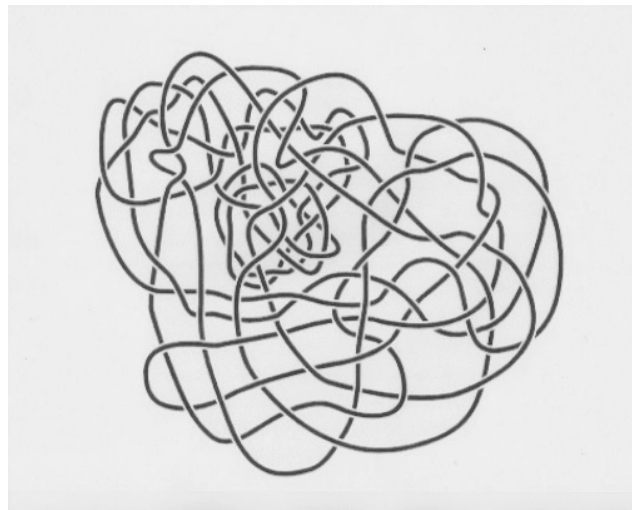
GIVEN : KNOT

QUESTION : CAN YOU UNTIE IT ?

CAN BE DECIDED BY AN ALGORITHM

BUT CAN BE LONG

BUT THEN HOW DO WE DISTINGUISH KNOTS ?



ALGORITHMS, INVARIANTS

GIVEN : KNOT

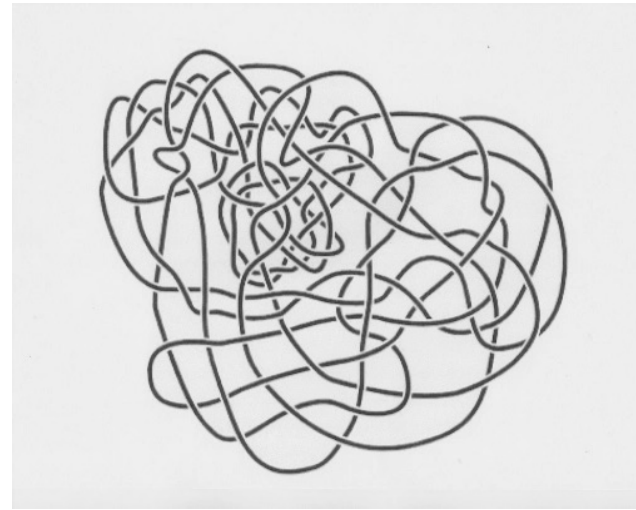
QUESTION : CAN YOU UNTIE IT ?

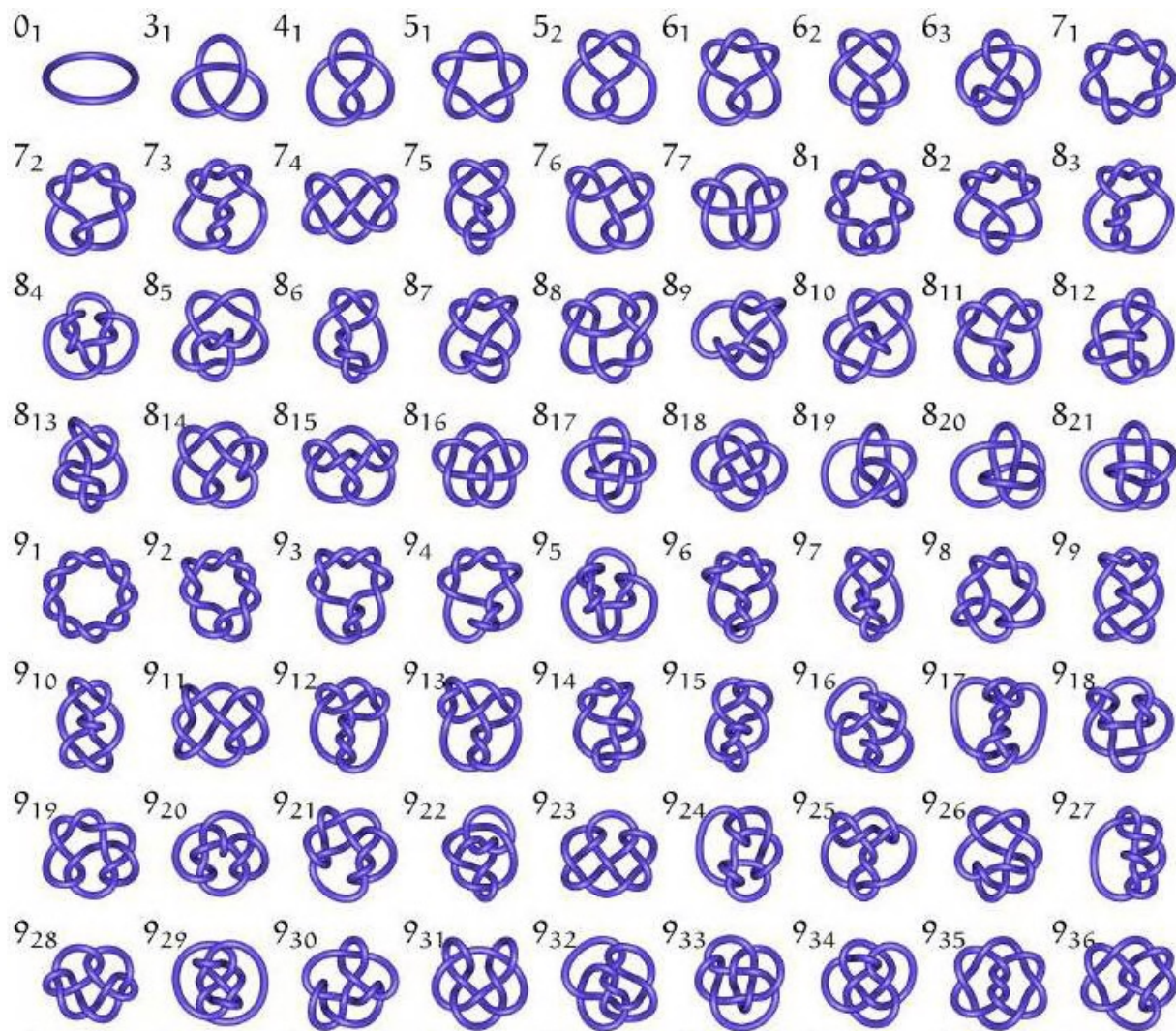
CAN BE DECIDED BY AN ALGORITHM
BUT CAN BE LONG

BUT THEN HOW DO WE DISTINGUISH KNOTS ?

- INVARIANTS (ASSIGN NUMBERS, POLYNOMIAL OR MORE COMPLICATED STRUCTURES TO KNOTS)

DREAM : EASY TO COMPUTE & DISTINGUISHES ALL KNOTS
COMPLETE SYSTEM OF INVARIANTS





WHY DO WE STUDY KNOTS?

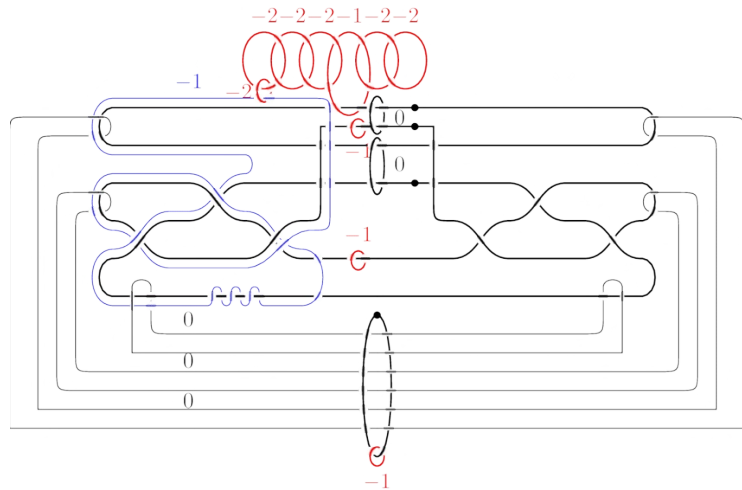
- INTERESTING

WHY DO WE STUDY KNOTS?

- INTERESTING
- IMPORTANT EXAMPLES

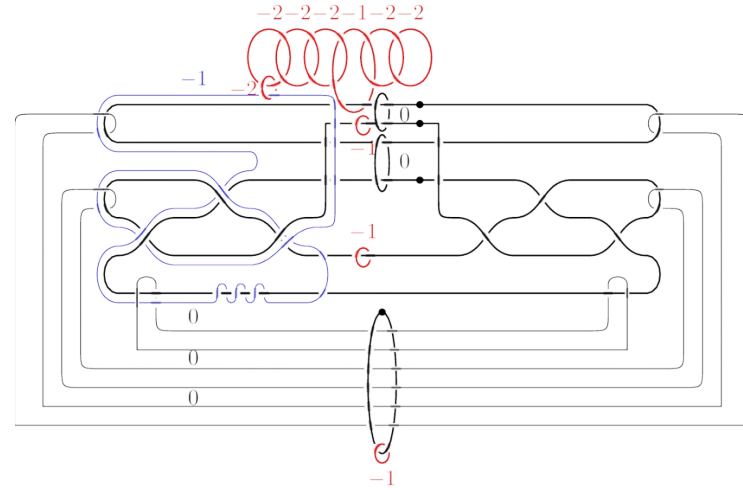
WHY DO WE STUDY KNOTS?

- INTERESTING
- IMPORTANT EXAMPLES
- WINDOW TO LOW DIMENSIONAL TOPOLOGY (3- & 4-MANIFOLDS CAN BE ENCODED VIA KNOTS)

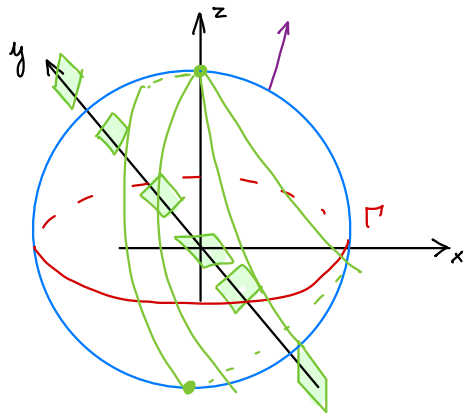
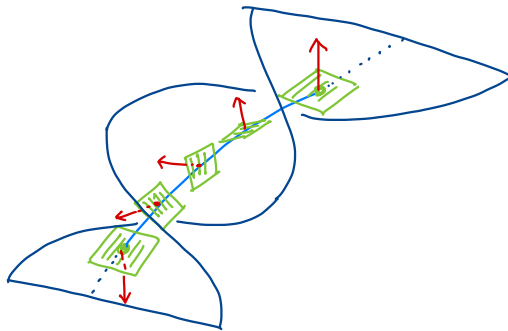
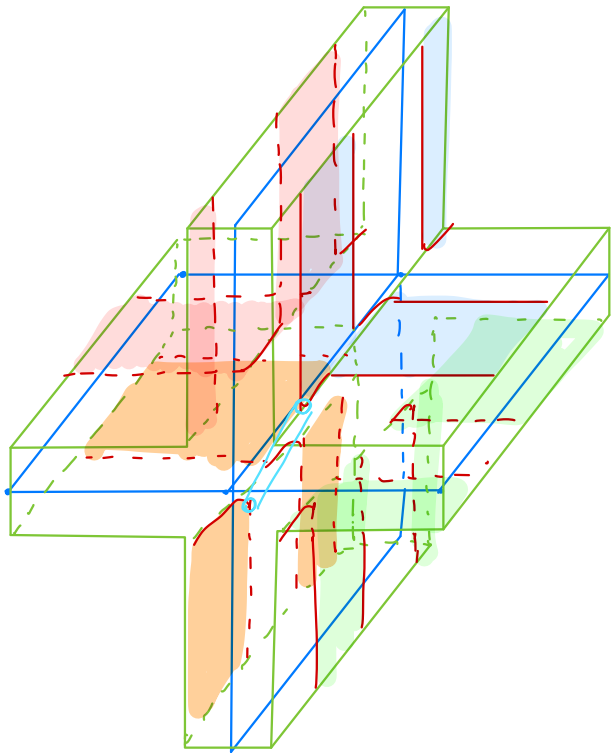


WHY DO WE STUDY KNOTS?

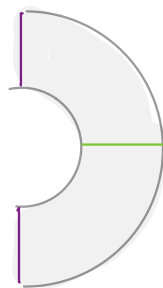
- INTERESTING
- IMPORTANT EXAMPLES
- WINDOW TO **LOW DIMENSIONAL TOPOLOGY** (3- & 4-MANIFOLDS CAN BE ENCODED VIA KNOTS)
- PHYSICS (**TOPOLOGICAL QUANTUM FIELD THEORY**)
- BIOLOGY (**PROTEIN FOLDING, BACTERIAL DNA**)



INTERESTING FIGURES FROM MY RESEARCH



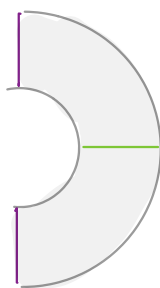
INTERESTING FIGURES FROM MY RESEARCH



S_0



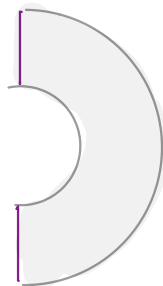
$S_{\pi/2}$



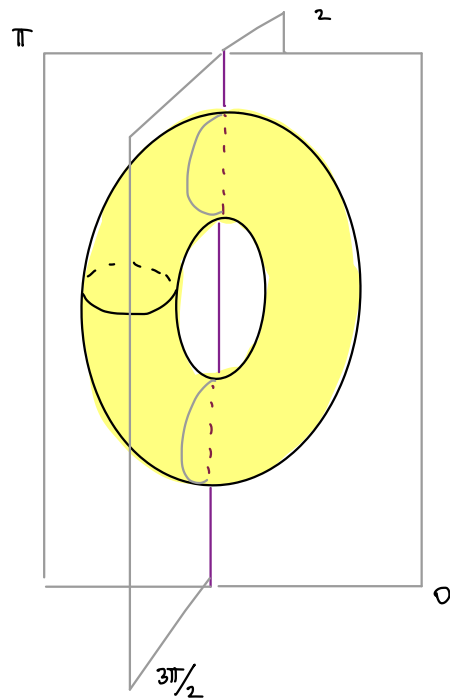
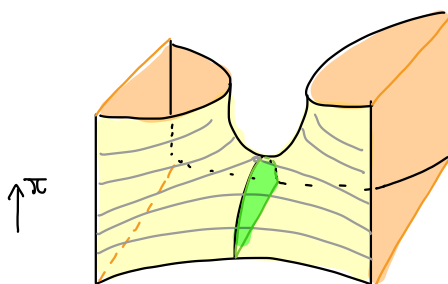
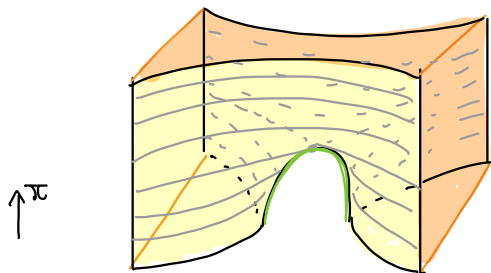
S_{π}



$S_{3\pi/2}$



$S_{2\pi}$



INTERESTING FIGURES FROM MY RESEARCH

