关于一些链环的投影图的解纽数的研究

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# Chapter 1. Introduction

绳结是人们日常所见之物。据说古人曾结绳记事，亚历山大大帝砍断绳结后开始轰轰烈烈的 征服东方之旅，现在在魔术表演中更是常见，电影《致命魔术》中正是因为绳结出了人命， 然后开始了离奇、引人入胜而又深刻探讨了人性的故事。 但绳结里其实蕴含了有趣迷人又实用的数学理论：纽结理论。 那么什么是纽结呢？可以通俗地认为绳结就是纽结，更数学地说，纽结是三维空间中的简单 闭曲线。纽结理论的历史，可以追溯到19世纪高斯、Listing等人。现代理论物理学中迷人的 弦论，更是纽结理论大发异彩之处。1867年，英国物理学家开尔文勋爵（

First, let introduce topology, for my thesis is about knot theory , which is a branch of topology , and topology is a beautiful branch of mathematics.

## Topology

Topology is the study of the category whose objects are topological spaces, and whose morphisms are continuous functions. This category is much more flexible than that of metric spaces, for example it admits the construction of arbitrary quotients and intersections of spaces. Accordingly, topology underlies or informs many and diverse areas of mathematics, such as functional analysis, operator algebra, manifold/scheme theory, hence algebraic geometry and differential geometry, and the study of topological groups, topological vector spaces, local rings, etc. Not the least, it gives rise to the field of homotopy theory, where one considers also continuous deformations of continuous functions themselves (“homotopies”). Topology itself has many branches, such as low-dimensional topology or topological domain theory.

## Knot Theory ATTACH

In topology, knot theory is the study of mathematical knots. While inspired by knots which appear in daily life, such as those in shoelaces and rope, a mathematical knot differs in that the ends are joined together so that it cannot be undone, the simplest knot being a ring (or "unknot").



In mathematical language, a knot is an embedding of a circle in 3-dimensional Euclidean space, (in topology, a circle isn't bound to the classical geometric concept, but to all of its homeomorphisms). Two mathematical knots are equivalent if one can be transformed into the other via a deformation of { ℝ 3}ℝ 3 upon itself (known as an ambient isotopy); these transformations correspond to manipulations of a knotted string that do not involve cutting the string or passing the string through itself.

Knots can be described in various ways. Given a method of description, however, there may be more than one description that represents the same knot. For example, a common method of describing a knot is a planar diagram called a knot diagram. Any given knot can be drawn in many different ways using a knot diagram. Therefore, a fundamental problem in knot theory is determining when two descriptions represent the same knot.

A complete algorithmic solution to this problem exists, which has unknown complexity. In practice, knots are often distinguished by using a knot invariant, a "quantity" which is the same when computed from different descriptions of a knot. Important invariants include knot polynomials, knot groups, and hyperbolic invariants.

The original motivation for the founders of knot theory was to create a table of knots and links, which are knots of several components entangled with each other. More than six billion knots and links have been tabulated since the beginnings of knot theory in the 19th century.

To gain further insight, mathematicians have generalized the knot concept in several ways. Knots can be considered in other three-dimensional spaces and objects other than circles can be used; see knot (mathematics). Higher-dimensional knots are n-dimensional spheres in m-dimensional Euclidean space.

# Chapter 2. Basic Theory about Knot Theory and the Unknoting Number

# Chapter 3. Unknoting Number for Kanenobu Knot

# Chapter 4. Unknoting Number for Generalized Kanenobu Knot

# Chapter 5. Unknoting

# Chapter 5. Summary and Outlook

# Chapter 6. Acknowledgements

# Bibliography