

# Knot Theory and its Applications

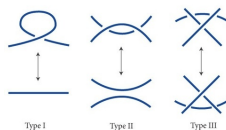
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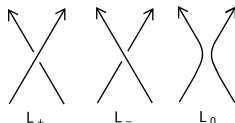
Knot theory is the embedding of one topological space into another topological space. Knot theory was first proposed as the flawed vortex model of atoms by Lord Kelvin, but was later proved to be incorrect. Some fundamental theorems of involved in knot theory include one involving Reidemeister moves (transforming knots into unknots) and knot invariants such as the Alexander Polynomial, Conway Polynomial and Jones Polynomial that originated in math and physics. It has applications in cell replication, where DNA must be unknotted and undergo a recombination process. Knots can also be used to improve encryption processes and increase security.

# Summary

- Theorem:** Two diagrams represent equivalent knots if and only if one can be transformed into the other by a finite sequence of Reidemeister moves.



- The knot invariant polynomials are *skain related* which means they are identical at every point except at one crossing.



- 1 Rama Mishra and Shantha Bhushan. “Knot Theory in Understanding Proteins.” *Journal of Mathematical Biology*. 22 November 2011: 1187-1213.
- 2 Nelson, Sam. “The Combinatorial Revolution in Knot Theory.” American Mathematical Society. 2011: 1553-1561.