Knot theory with Legos

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Abstract

A genus g handlebody-knot is a handlebody of genus g embedded in 3-dimensions. In the case $g = 1$, it is equivalent to a classical knot—a closed curve in the 3-space.

Much of the topological content of a handlebody-knot can be extracted from its exterior, namely the complementary part of the embedded handlebody in 3-dimensions. It is one of the primary tools to classify handlebody-knots and construct their invariants. In fact, in the genus one case, the homeomorphism type of a handlebody-knot exterior completely determines the isotopy type of the handlebody-knot.

In this talk, we consider genus 2 handlebody-knots, and explain how their exteriors can be pieced together from simple building blocks, our"lego bricks", and how such decompositions can be used to classify handlebody-knots and study their symmetries.