

Optimistic Rough Tentative Plan. Second introduction: algebraic knot theory.
Then KTGs to the pentagon and the hexagon.

Pasted from <<http://www.math.toronto.edu/~drorbn/Talks/Aarhus-1305/>>

0. on board:

Define $F: \mathcal{K} \rightarrow \mathcal{A}$ by $F(D) = \sum_K \frac{(-\theta)^k}{k!} \frac{d^k D}{d\theta^k}$,
and $Z(K) = e^{sl(K)\theta} \cdot F(Z(K^-))$. Then
 Z is a UFTI of framed knots.

1. AKT as planned:

Three Easy Problems:

- Determine the "genus" of a knot.
- Determine the "unknotting number" of a knot.
- Decide if a knot is "Ribbon".

Chim 1: $K(\theta) = \{ \text{framed knot} \} = \{ \text{framed link} \}$
where θ is the "topological linking" operator.

Algebraic Knot Theory: Suppose we had invariants \mathcal{Z} :

$$K(\infty) \xrightarrow{\mathcal{Z}} \mathcal{A}(\infty)$$

$$\text{framed link} \xrightarrow{\mathcal{Z}} \mathcal{A}(\theta)$$

Then $\mathcal{Z}(\text{framed link}) \in \mathcal{A}(\theta)$ and we have an algebraic invariant detecting framed link. Similarly for detecting framed link...

Chim 2: $K(\theta) = \{ \text{framed knot} \} = \{ \text{framed link} \}$
where θ is the "topological linking" operator.

Algebraic Knot Theory:

$$K(\theta) \xrightarrow{\mathcal{Z}} \mathcal{A}(\theta) \xrightarrow{\mathcal{Z}} \mathcal{A}(\infty)$$

So $\mathcal{Z}(\text{framed link}) \in \mathcal{A}(\theta)$ and we have an algebraic invariant detecting framed link.

Chim 3: $K(\theta) = \{ \text{framed knot} \} = \{ \text{framed link} \}$
where θ is the "topological linking" operator.

Algebraic Knot Theory:

$$K(\theta) \xrightarrow{\mathcal{Z}} \mathcal{A}(\theta) \xrightarrow{\mathcal{Z}} \mathcal{A}(\infty)$$

So $\mathcal{Z}(\text{framed link}) \in \mathcal{A}(\theta)$ and we have an algebraic invariant detecting framed link.

Internal Quasitors: Involve only chords and no strands.

Examples:

- $\mathcal{Z}(\text{framed link}) = 0$
- $\mathcal{Z}(\text{framed link}) = 0$
- $\mathcal{Z}(\text{framed link}) = 0$
- ... to your imagination

Side 2: Let us look at the... $\mathcal{Z}(\text{framed link}) = 0$

Theorem: There is a minimal question asking the Alexander polynomial.

Proof: Via the "Internal Quasitor" of the Alexander Weight System:

- $\mathcal{Z}(\text{framed link}) = 0$
- $\mathcal{Z}(\text{framed link}) = 0$
- $\mathcal{Z}(\text{framed link}) = 0$

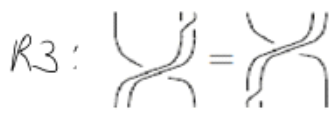
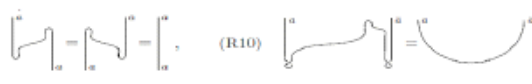
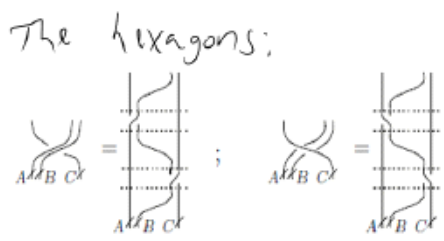
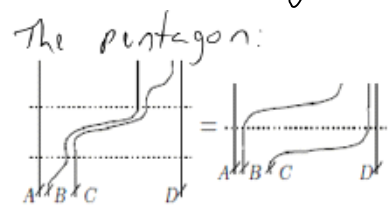
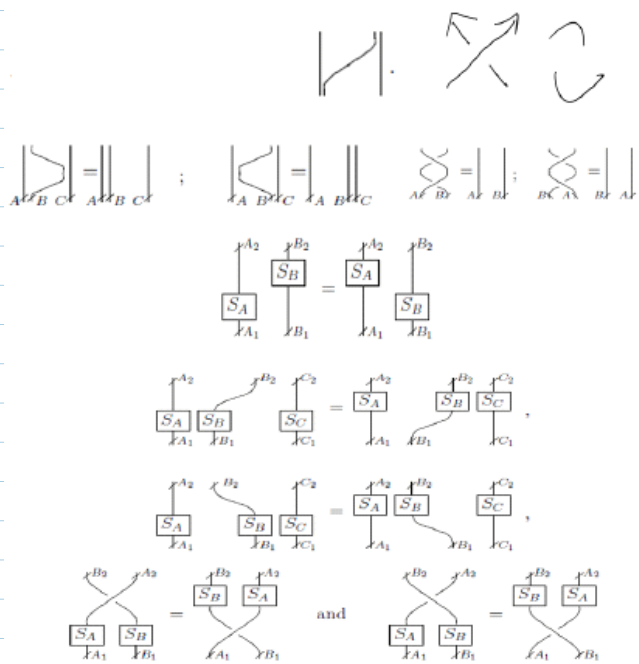
What remains is a polynomial invariant or invariant of...
Conjecture: This explains every thing that we know about the Alexander polynomial.

Skip for now

2. Associators as was planned for yesterday.



The pentagon:



3. KTG are the "same" as associators. } not done
4. Low algebra into universal env. algebras.
5. The projectivization machine. } not done