

Hefei-1811 Handout on 181010

October 10, 2018 9:39 AM

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Dror Bar-Natan: Talks: Hefei-1811: Thanks for inviting me to Hefei! Handout, video, links at <http://drorbn.net/hef18/> 

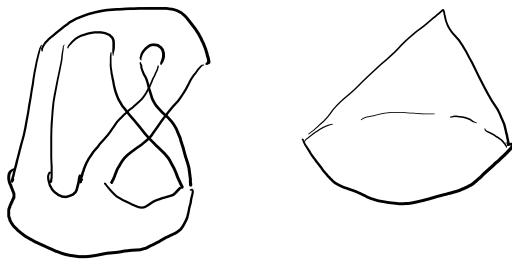
Locally Euclidean Knotted Objects, Meta-Hopf Algebras, and Circuit Algebras

Abstract. Seeing that I have nothing to say about operads, I'll talk about other "generalized algebraic structures" that I like. Specifically, I will explain what are locally Euclidean knotted objects and how they form a "meta-Hopf algebra" (along the way explaining what is that latter notion). I will then describe the "circuit algebra" of linearized circuits and explain how to use it to construct a "Yang-Baxter meta-Hopf algebra" which generalizes the Alexander polynomial. I will have no time to explain, yet I'll sketch, how "solvable approximation of semi-simple Lie algebras" lead to more sophisticated Yang-Baxter meta-Hopf algebras which lead to very powerful poly-time computable knot polynomials.

what we care for in Knot Theory.

Can dips ✓

Euclidean surfaces. def



genus
beauty

genus
AD

ribson

⇒ we care about algebraic structures made of more general knotted objects

Locally Euclidean tangles

- * Def
- * Examples of moves
- * Kupersberg's Theorem
- * "Rotational virtual tangles"

S

"LET is a meta-Hopf algebra"

operations on LET:

$\sigma, m, \Delta, \eta, \epsilon$

The TQFT paradigm and criticism

So LET make a "meta-li-algebra"
[LET(S) isn't LET(S) ⊗ S]

Space for relations: meta-associativity, meta-co-assoc., m/Δ compatibility, m/Δ/S relations.
/ show each relation using both tangle notation and circuit notation.

Circuit algebras

The CA of tangles

..... [Archibald]

Directed CA,

The CA of linear circuits

references

propaganda.

Implementations:

1. CA of lin. circuits.
2. The "USB" CA.
3. The Alexander MHA.