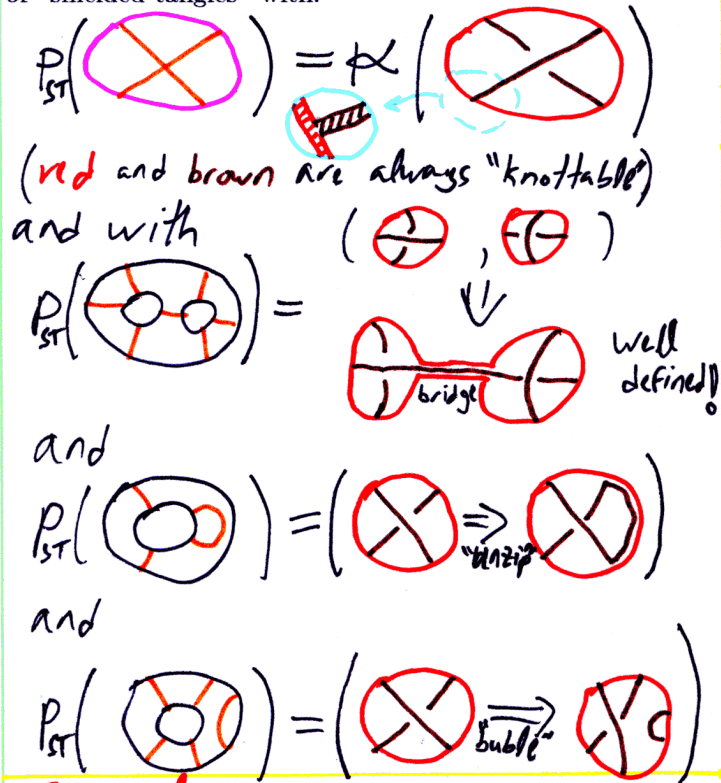


Theorem. There exists a skeletal (very) planar algebra of "shielded tangles" with:



Definition. A planar algebra has spaces / operations indexed by Light entertainment

(with obvious compatibilities between ops.)

Examples. 1. My favourite - tangles:

$P_T(\text{circle with red lines}) = \{ \text{circle with red lines and white circle} \}$

makes Reidemeister's Theorem into gens/rels:

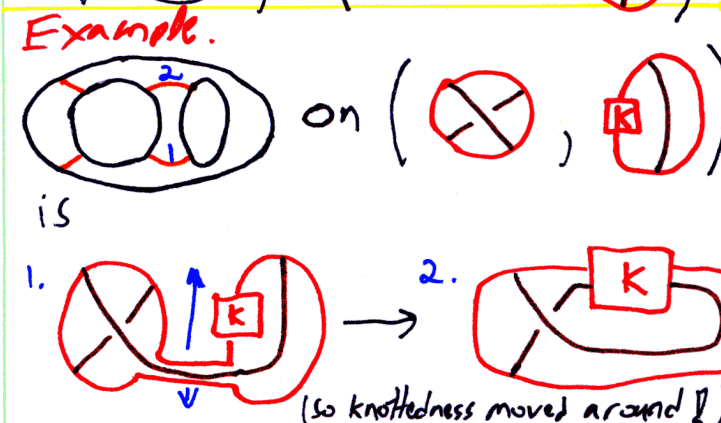
$P_T = \langle \text{crossing}, \text{crossing} \rangle / \text{crossing} = \text{circle}, \text{crossing} = \text{circle}, \text{crossing} = \text{circle}$

2. "skeletons": Def. A skeletal planar algebra is "fibred" over  $S$

$S = P_T / \text{crossing} = \text{circle} = \{ \text{crossing} \}$

3. TL:  $\{ \text{circle with red lines} \} / \text{circle} = \text{circle}$

4. Tensor: choose  $H$ ,  $V$  use  $H \otimes V$ ; appropriate contractions



All make sense in higher genus! Not very planar

PROOF. key point: on the level of skeletons - symmetric

is  $\text{crossing} = \text{crossing}$  (well defined?)

... and trees are never knotted

Facts. 1. There is no planar-algebra-structure respecting universal Finite type invariant

$\{ \text{ordinary tangles} \} \rightarrow \langle \text{crossing} \rangle / \{ 4T, STU, AS, IHX \}$

2. But there is one for shielded tangles!

$\exists Z : \{ \text{shielded tangles} \} \rightarrow \langle \text{crossing} \rangle / \text{rels.}$

3. This  $Z$  provides a Reidemeister context for the Kontsevich integral!

4. A cousin of  $Z$  is equivalent to the Drinfeld theory of associators.

Dream - A similar story will be told for "virtual knots", and will provide a topological interpretation of a "universal quantum group". See ... / Talks / Hanoi-0708

1. Slides/blame/Some propaganda powerpoint are evil!  
\* Can you always sync with the speaker?  
\* Don't you want to look back at pictures long gone?

2. Handouts are cool!

Everything's always in front of you, even when you go home.

"God created the knots, all else in topology is the work of mortals"

Leopold Kronecker (modified)

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