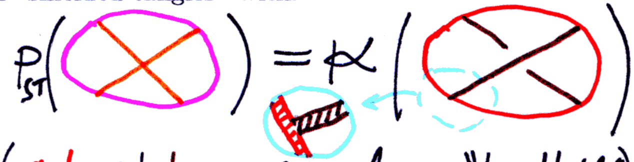
A Very Non-Planar Very Planar Algebra

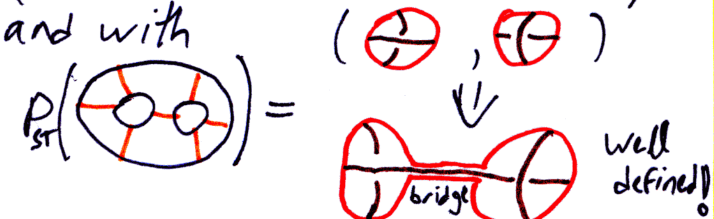
(old work with Dylan Thurston)

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



(red and brown are always "knottable")

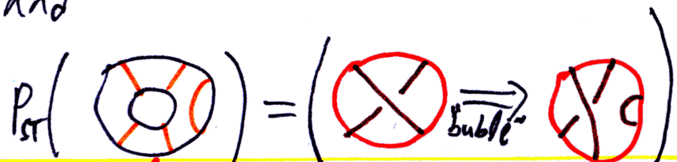
and with



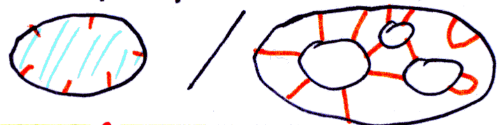
well defined!

and

and



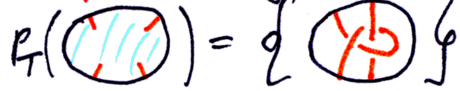
Definition. A planar algebra has spaces / operations indexed by



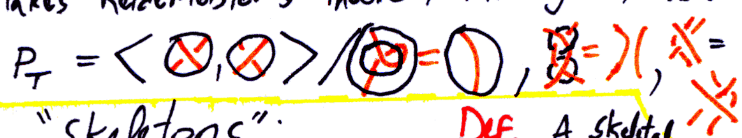
(with obvious compatibilities between ops.)

Light entertainment

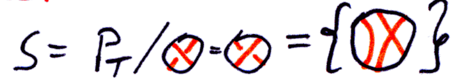
Examples. 1. My favourite – tangles:



makes Reidemeister's Theorem into gens/rels:

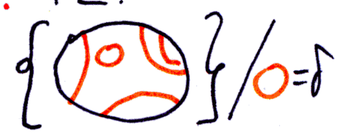


2. "Skeletons":

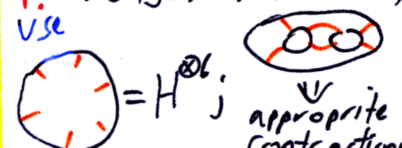


Def. A skeletal planar algebra is "fibred" over S

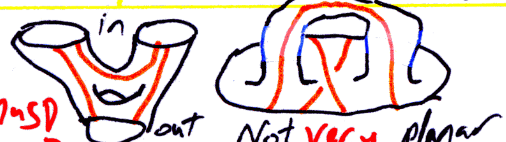
3. TL:



4. Tensor: choose H, use

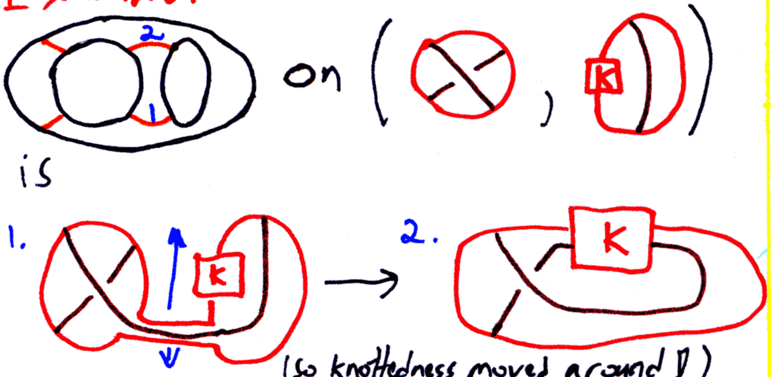


All make sense in higher genus!



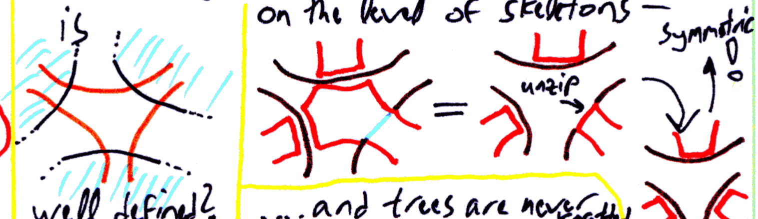
Not very planar

Example.



Proof. key point: is well defined?

on the level of skeletons – symmetric!

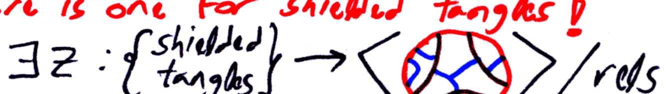


.... and trees are never knotted

The deeper connections

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

2. But there is one for shielded tangles!



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

4. A cousin of Z is equivalent to the Drinfel'd theory of associators.

Some propaganda

1. Slides/beamer/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.

The dreams

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

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

Leopold Kronecker (modified)

The Knot Atlas

Visit!

katlas.org

Edit!

http://www.math.toronto.edu/~drorbn/Talks/Fields-0709/

More at http://www.math.toronto.edu/~drorbn/Talks/Fields-0709/