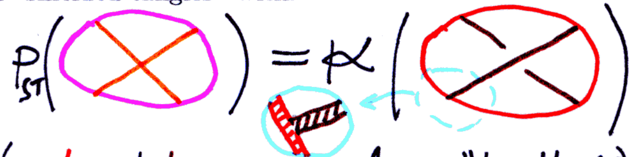
A Very Non-Planar Very Planar Algebra

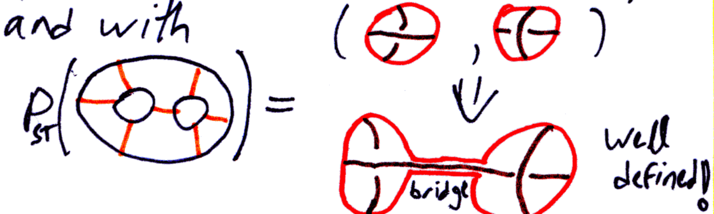
(old work with Dylan Thurston)

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



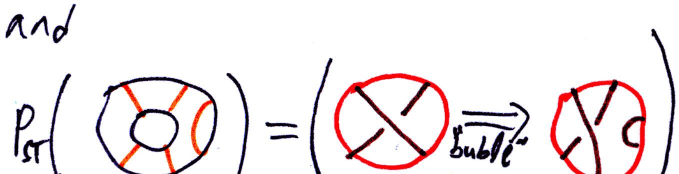
(red and brown are always "knottable")

and with

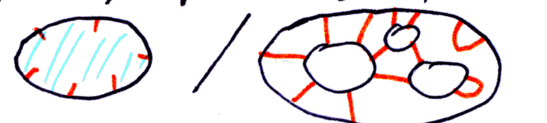


and

and



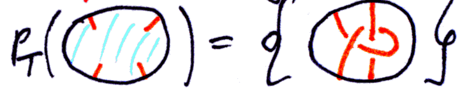
Definition. A planar algebra has spaces / operations indexed by



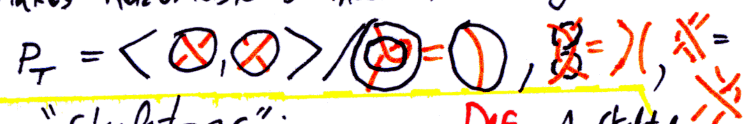
(with obvious compatibilities between ops.)

Light entertainment

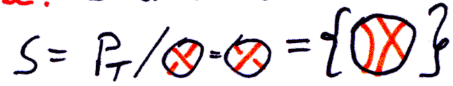
Examples. 1. My favourite - tangles:



makes Reidemeister's theorem into gens/rels:

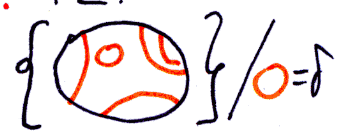


2. "skeletons":

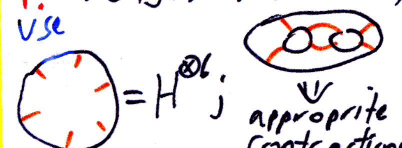


Def. A skeletal planar algebra is "fibred" over S

3. TL:

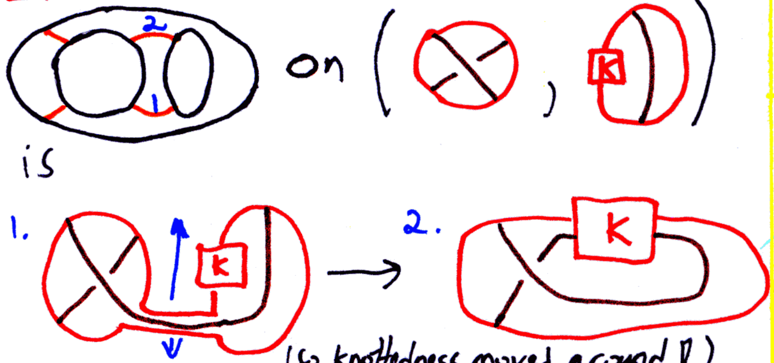


4. Tensor: choose H, use



appropriate contractions

Example.



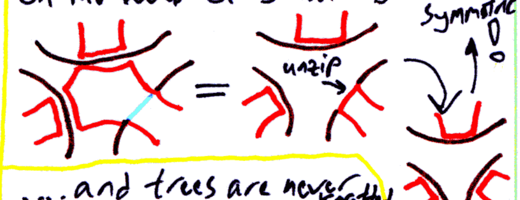
(so knottedness moved around!)

All make sense in higher genus!

Not very planar

Proof. key point:

on the level of skeletons —

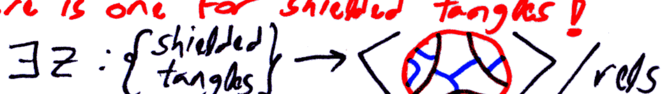


.... and trees are never knotted

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)

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