

"broken surface diagram"

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$\omega := \text{http://www.math.toronto.edu/~drorbn/Talks/HUJI-140101}$

**Knots in 4 Dimensions and the Simplest Open Problem About Them**

Handout and links at  $\omega$

**Abstract.** I will describe a few 2-dimensional knots in 4-dimensional space in detail, then tell you how to make many more, then tell you that I don't really understand my way of making them, yet I can tell at least some of them apart in a colourful way.

4D Knots.

A 4D knot by Carter and Saito  $\omega$ /CS

$\omega$ /F

Satoh  $\omega$ /Dal

The Generators

"the crossing"  $\omega$ /X

"v-xing"  $\omega$ /vX

"cup"

"the + vertex"

The Double Inflation Procedure.

Riddle. What band, inflated, gives the "Wen"?

Wen

Planar Algebra: The objects are "tiles" that can be composed in arbitrary planar ways to make bigger tiles.

OC: as UC: yet not UC:

"God created the knots, all else in topology is the work of mortals." Leopold Kronecker (modified)

www.katlas.org The Knots Files

"topographical thermal convection"

1. Finish the 2 4d-knots.
- ✓ 2. show trefoil as broken line diagram
3. show the CS broken surface diagram.
- ✓ 4. show the Trefoil using the Thermal convection.
5. show the Dalvit knot.
6. Generators, conjecture.
7. why care? Invariants.
8. 3-colourings in 3D.
9. 3-colourings in  $wK$
10. 3-colourings in  $K2$
11. what I really care about - Taylor's theorem.
12. Exercises:

a. The space of 3-colourings of a knot/2-knot is naturally a vector space over  $\mathbb{F}_3$ , hence the number of 3-colourings of a knot/2-knot is always a power of 3.