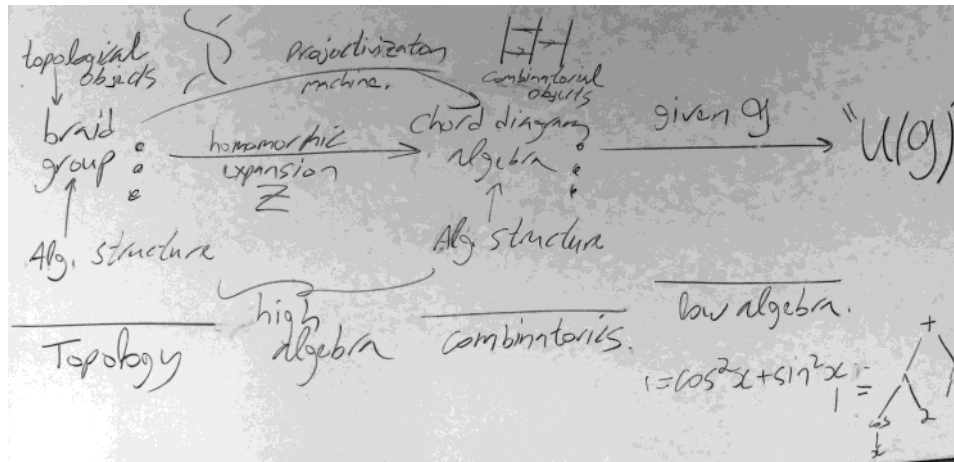



Caen Menu / Planning Handout

June-05-12
8:40 PM



The $u \rightarrow v \rightarrow w$ & p Stories

	Topology	Combinatorics	Low Algebra	High Algebra	Counting Coincidences Conf. Space Integrals	Quantum Field Theory	Graph Homology
u-Knots	The usual Knotted Objects (KOs) in 3D — braids, knots, links, tangles, knotted graphs, etc.	Chord diagrams and Jacobi diagrams, modulo $4T$, STU , IHX , etc.	Finite dimensional metrized Lie algebras, representations, and associated spaces.	The Drinfel'd theory of associators.	Today's work. Not beautifully written, and some detour-forcing cracks remain.	Perturbative Chern-Simons-Witten theory.	The "original" graph homology.
v-Knots	Virtual KOs — "algebraic", "not embedded"; KOs drawn on a surface, mod stabilization.	Arrow diagrams and v-Jacobi diagrams, modulo $6T$ and various "directed" $STUs$ and $IHXs$, etc.	Finite dimensional Lie bi-algebras, representations, and associated spaces.	Likely, quantum groups and the Etingof-Kazhdan theory of quantization of Lie bi-algebras.	No clue.	No clue.	No clue.
w-Knots	Ribbon 2D KOs in 4D; "flying rings". Like v, but also with "overcrossings commute".	Like v, but also with "tails commute". Only "two in one out" internal vertices.	Finite dimensional co-commutative Lie bi-algebras ($\mathfrak{g} \ltimes \mathfrak{g}^*$), representations, and associated spaces.	The Kashiwara-Vergne-Alekseev-Torossian theory of convolutions on Lie groups / algebras.	No clue.	Probably related to 4D BF theory.	Studied.
p-Objects	No clue.	"Acrobat towers" with 2-in many-out vertices.	Poisson structures.	Deformation quantization of poisson manifolds.	Configuration space integrals are key, but they don't reduce to counting.	 Work of Cattaneo.	Studied.

À la carte Items

1. The 6-step relationship with convolutions of Lie groups and algebras.
2. Meta-groups and the Alexander polynomial (results and their w-origin).
3. The "Infinitesimal Alexander Module" and the w-invariant of knots.
4. Quadraticity of the virtual braid group following P. Lee.
5. Configuration space integrals and Chern-Simons theory.
6. The Grothendieck-Teichmüller group.
7. The BHLR "18 spaces of virtual knots".
8. "Algebraic Knot Theory".
9. Archibald's MVA for tangles.
10. Unrelated fun things.