

<p>Written Chern-Simons</p> <p><b>u-knots</b></p> <p>u-knots are usual knots:</p> <p>=PA <math>\langle \text{R} \times 23 \rangle_0</math> legs "Knots in <math>\mathbb{R}^3</math>"</p>	<p><math>1-1 \rightarrow</math></p> <p><b>v-knots</b></p> <p>v-knots are virtual knots:</p> <p>=PA <math>\langle \text{R} \times 23 \rangle_0</math> =CA <math>\langle \text{R} \times 23 \rangle_0</math> = Knots on surfaces, modulo stabilization:</p>	<p><math>\text{onto} \rightarrow</math></p> <p><b>w-knots</b></p> <p>w is for welded, weakly v, and warmup:</p> <p>4 <math>\{w\text{-knots}\} = \{v\text{-knots}\} / (\text{OC})</math> where OC is Overcrossings Commute:</p> <p>Related to "movies of flying rings" to knotted tubes in 4-space, and to "basis conjugating automorphisms of free groups".</p> <p>McCool Goldsmith Fenn Rimanyi Rourke Satoh Brendle Hatcher</p>
--	---	---

$\mathcal{K}^u$	$\rightarrow$	$\mathcal{K}^v$	$\rightarrow$	$\mathcal{K}^w$
<p>Expansion exists, Eg., using the Kontsevich integral.</p> <p>No homomorphic expansion!</p>	<p>wide open</p>			<p>Homomorphic <math>\mathcal{Z}^v</math> exists!</p>
$\mathcal{Z}^u$		$\mathcal{Z}^v$		$\mathcal{Z}^w$
$\mathcal{A}^u$	$\rightarrow$	$\mathcal{A}^v$	$\rightarrow$	$\mathcal{A}^w$
	$\rightarrow$		$\rightarrow$	
$4T$		$6T$		$TC$ $4T$
$4T$ : 		$6T$ : 		$TC$ : 

$\downarrow \mathcal{Z}^u$	$\downarrow \mathcal{Z}^v$	$\downarrow \mathcal{Z}^w$ Today
$U(\mathfrak{g})^{\otimes C}$	$U(\mathfrak{g}_+ \oplus \mathfrak{g}_-)^{\otimes C}$	$U(\mathbb{I}\mathfrak{g})^{\otimes C}$
For any metrized f.d. Lie algebra $\mathfrak{g}$	For any f.d. Lie bialgebra $\mathfrak{g} = \mathfrak{g}_+ \oplus \mathfrak{g}_-$	For any f.d. Lie algebra $\mathfrak{g}$