

<p>Written Chern-Simons</p> <p>u-knots</p> <p>u-knots are usual knots:</p> <p>=PA $\langle \text{R} \times 23 \rangle_0$ legs "Knots in \mathbb{R}^3"</p>	<p>$1-1 \rightarrow$</p> <p>v-knots</p> <p>v-knots are virtual knots:</p> <p>=PA $\langle \text{R} \times 23 \rangle_0$ =CA $\langle \text{R} \times 23 \rangle_0$ = Knots on surfaces, modulo stabilization:</p>	<p>$\text{onto} \rightarrow$</p> <p>w-knots</p> <p>w is for welded, weakly v, and warmup:</p> <p>4 $\{w\text{-knots}\} = \{v\text{-knots}\} / (\text{OC})$ where OC is Overcrossings Commute:</p> <p>yet \neq UC</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>
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\mathcal{K}^u	\longrightarrow	\mathcal{K}^v	\longrightarrow	\mathcal{K}^w
<p>Expansion exists, Eg., using the Kontsevich integral.</p> <p>No homomorphic expansion!</p>	<p>wide open</p>			
$\downarrow \mathcal{Z}^u$		$\downarrow \mathcal{Z}^v$		$\downarrow \mathcal{Z}^w$
\mathcal{A}^u	\longrightarrow	\mathcal{A}^v	\longrightarrow	\mathcal{A}^w
$4T$		$6T$		TC $4T$
$4T$: 		$6T$: 		TC :

$\downarrow \mathcal{U}^u$	$\downarrow \mathcal{U}^v$	$\downarrow \mathcal{U}^w$ 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}