

<p>Written Chern-Simons</p> <p><b>u-knots</b></p> <p>u-knots are usual knots:</p> <p>"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 \rangle</math> <math>\left  \begin{matrix} R \times 23 \\ VR123 \\ M \end{matrix} \right _0</math></p> <p>= CA <math>\langle \rangle</math> <math>\left  \begin{matrix} R \times 23 \end{matrix} \right _0</math></p> <p>= Knots on surfaces, modulo stabilization:</p>	<p><math>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}\} / (OC)</math></p> <p>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>
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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>	<p>Homomorphic <math>\mathbb{Z}^v</math> exists!</p>		<p>Homomorphic <math>\mathbb{Z}^w</math> exists!</p>
$\downarrow \mathbb{Z}^u$		$\downarrow \mathbb{Z}^v$		$\downarrow \mathbb{Z}^w$
$\mathcal{A}^u$	$\longrightarrow$	$\mathcal{A}^v$	$\longrightarrow$	$\mathcal{A}^w$
<p>4T:</p>		<p>6T:</p>		<p>TC:</p> <p>4T:</p>

$\downarrow \mathcal{T}^u$

$U(\mathfrak{g})^{\otimes \mathbb{C}}$

For any metrized f.d. Lie algebra  $\mathfrak{g}$

$\downarrow \mathcal{T}^v$

$U(\mathfrak{g}_+ \oplus \mathfrak{g}_-)^{\otimes \mathbb{C}}$

For any f.d. Lie bialgebra  $\mathfrak{g} = \mathfrak{g}_+ \oplus \mathfrak{g}_-$

$\downarrow \mathcal{T}^w$  Today

$U(\mathbb{I}\mathfrak{g})^{\otimes \mathbb{C}}$

For any f.d. Lie algebra  $\mathfrak{g}$