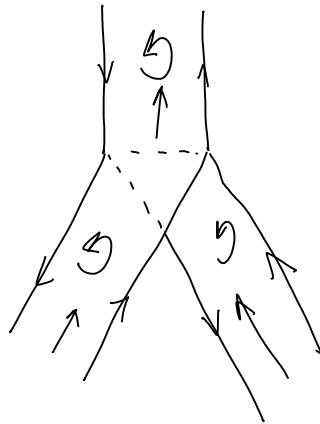


The u and w nitty-gritty details, 1

Made for Caen; Dror Bar-Natan and Zsuzsanna Dancso, June 2012

<http://www.math.toronto.edu/~drorbn/Talks/Caen-1206/>



Make nice pictures of the right hand rule?

uJ	wJ
<p>xings.</p>	
<p>vertices</p>	
<p>Framing, etc</p> <ul style="list-style-type: none"> • strands are framed 	<ul style="list-style-type: none"> • strands are ribbons w/ two sides + framed (two sides mirror) • CA • unzip (use framing) • antipode A • delete • cap
<p>ops</p> <ul style="list-style-type: none"> • unzip • on switch S • delete 	<p>Wen: $\begin{matrix} \uparrow & \downarrow \\ W^2 = 1 & \\ \text{"switch"} & \\ S = WAW & \end{matrix}$</p>
<p>Map a $uJ \rightarrow wJ$</p> <p>$X^+ \mapsto R_{12}^+$ $X^- \mapsto R_{21}^-$</p> <p>$Y^+ \mapsto V_{12}^+$ $Y^- \mapsto V_{21}^-$</p> <p>band comes from BB framing framing comes from u-framing</p> <p>$uJ \xrightarrow{u, S, d} uJ$ $\downarrow a$</p> <p>$wJ \xrightarrow{u, A, d} wJ$ $\downarrow a$</p>	<p>Map $\alpha \mathcal{A}^u \rightarrow \mathcal{A}^w$</p> <p>$H \mapsto H + H$</p> <p>Compatibility:</p> <p>$uJ \xrightarrow{z^u} \mathcal{A}^u$ $\downarrow a$</p> <p>$wJ \xrightarrow{z^w} \mathcal{A}^w$ $\downarrow \alpha$</p> <p>Theta</p> <p>$\Theta = \alpha Z \begin{pmatrix} 1 & \\ & 1 \end{pmatrix}$</p>

The u and w nitty-gritty details, 2

Z^u

$\begin{matrix} \nearrow \\ \searrow \end{matrix} \rightarrow R_u = \begin{matrix} \uparrow \\ \downarrow \end{matrix}$
 $\begin{matrix} \searrow \\ \nearrow \end{matrix} \rightarrow R_u^{-1} = \begin{matrix} \downarrow \\ \uparrow \end{matrix}$
 $(R_u^u = R_u^{-u})$

$\begin{matrix} \nearrow \\ \searrow \\ \nearrow \\ \searrow \end{matrix} \rightarrow \begin{matrix} \square \\ \square \\ \square \\ \square \end{matrix}$
 $\begin{matrix} \nearrow \\ \searrow \\ \searrow \\ \nearrow \end{matrix} \rightarrow \begin{matrix} \square \\ \square \\ \square \\ \square \end{matrix}$

(adjustment cancels for balanced diagrams)

Equations

① R^4
 $R^{23} R^{13} V = V R^{(12)3}$

$\begin{matrix} \nearrow \\ \searrow \end{matrix} = \begin{matrix} \searrow \\ \nearrow \end{matrix}$

② Twist $V\Theta = R V^{21}$
 $\Theta = V^{-1} R V^{21}$

$\begin{matrix} \nearrow \\ \searrow \end{matrix} \leftarrow \text{this is } a(\frac{\pi}{2})$

Z^w

$\begin{matrix} \nearrow \\ \searrow \end{matrix} \rightarrow R_{12} = \begin{matrix} \leftarrow \\ \rightarrow \end{matrix}$ etc.
 $\begin{matrix} \searrow \\ \nearrow \end{matrix} \rightarrow \begin{matrix} \square \\ \square \end{matrix}$ etc.
 $\begin{matrix} \uparrow \\ \downarrow \end{matrix} \rightarrow \begin{matrix} \square \\ \square \end{matrix}$

③ Unitarity: $V \cdot A_1 A_2 (V) = 1$
 $A_1 A_2 V = \begin{matrix} \nearrow \\ \searrow \end{matrix} = \begin{matrix} \searrow \\ \nearrow \end{matrix} = \begin{matrix} \parallel \\ \parallel \end{matrix}$

④ Vertical flip $V(S_1 S_2 V) = R$
 $S_1 S_2 V = \begin{matrix} \nearrow \\ \searrow \end{matrix} = \begin{matrix} \searrow \\ \nearrow \end{matrix} = \begin{matrix} \nearrow \\ \searrow \end{matrix}$

⑤ Cap $c_{f_2}(V C^{(12)}) = c_{f_2}(C C^{\dagger})$

⑥ Side=nondeg. $d_1 V = d_2 V = 1$

Overhand rule?