

The Main Course

$B^{(m)} = (\text{PaB}^{(m)}, \mathbf{S} : \text{PaB}^{(m)} \rightarrow \text{PaP}, d_i, s_i, \square, \sigma)$

same-skeleton linear combinations allowed

$d_0$  (crossing) = ... ;  $d_0$  (cup) = ...

$d_2$  (cup) = ... ;  $d_2$  (crossing) = ...

$a =$  (cup) = ... ;  $\sigma =$  (crossing) = ...

$\square$  (cup) = ... and  $\square$  (crossing) = ...

$C^{(m)} = (\text{PaCD}^{(m)}, \mathbf{S} : \text{PaCD}^{(m)} \rightarrow \text{PaP}, d_i, s_i, \square, \tilde{R})$

same-skeleton linear combinations allowed

$d_2$  (cup) = ... ;  $d_0$  (cup) = ...

$a =$  (cup) = ... ;  $x =$  (crossing) = ...

$\tilde{R} = X \exp \frac{H}{2}$

$\square$  (cup) = ... and  $\square$  (crossing) = ...

ASSO

$d_4 \Phi \cdot d_2 \Phi \cdot d_0 \Phi = d_1 \Phi \cdot d_3 \Phi$

$d_1 \exp\left(\pm \frac{1}{2} t^{12}\right) = \Phi \cdot \exp\left(\pm \frac{1}{2} t^{23}\right) \cdot (\Phi^{-1})^{132} \cdot \exp\left(\pm \frac{1}{2} t^{13}\right) \cdot \Phi^{312}$

$s_1 \Phi = s_2 \Phi = s_3 \Phi = 1$

$\square \Phi = \Phi \otimes \Phi$

$\mathbf{s}$  (crossing) = ...

PaP

$d_4 \Gamma \cdot d_2 \Gamma \cdot d_0 \Gamma = d_1 \Gamma \cdot d_3 \Gamma$

$1 = \Gamma \cdot (\Gamma^{-1})^{132} \cdot \Gamma^{312}$

$d_1 t^{12} = \Gamma \cdot (t^{23} \cdot (\Gamma^{-1})^{132} + (\Gamma^{-1})^{132} \cdot t^{13}) \cdot \Gamma^{312}$

$e^{\epsilon(t^{13} + t^{23})} = \Gamma \cdot e^{\epsilon t^{23}} \cdot (\Gamma^{-1})^{132} \cdot e^{\epsilon t^{13}} \cdot \Gamma^{312}$

I have a nifty Free Lie calculator. Wanna play?

GT

GRT

Brands and the Grothendieck–Teichmüller Group, II