

# HOMFLY-PT with Knot Theory

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$$aH(\times) - a^{-1}H(\times) = zH(\cup)$$

$$a = e^{\eta x} \quad z = e^x - e^{-x}$$

$$e^{\eta x} H(L_+) - e^{-\eta x} H(L_-) = (e^x - e^{-x}) H(L_0)$$

$$\Rightarrow H(L_+) - H(L_-) = (e^x - e^{-x}) H(L_0) + (1 - e^{\eta x}) H(L_+) + (e^{-\eta x} - 1) H(L_-)$$

mod  $x^2$

$$\Rightarrow H(L_+) - H(L_-) = 2x H(L_0) - 2\eta x H(L_{\pm})$$

$$\Rightarrow \text{Diagram 1} \Rightarrow 2 \text{Diagram 2} - 2\eta \text{Diagram 3} = 0 \quad (\text{coeff of } x)$$

$$\text{Diagram 4} \Rightarrow 2 \text{Diagram 5} - 2\eta \text{Diagram 6} = 2 - 2\eta^2 = 2(1 - \eta^2)$$

$\Rightarrow$  Coeff of  $x$  in  $H(\text{2 comp. link})$  is  $2(1 - \eta^2) \cdot (\text{linking number})$

$$L = \text{Diagram 7} \Rightarrow l = -1$$

$\Rightarrow$  Indeed Knot Theory computed

$\Rightarrow$  Indeed KnotTheory' computed  
the HOMFLYPT OF the mirror of  
 $L$ .