

Topological Categorification of HOMFLY Skein Theory.

I. Skein Theory for HOMFLY

$$P(L) \in \mathbb{Z}[q^{\pm 1}, \alpha^{\pm 1}][\partial] / \partial(\alpha - \alpha^{-1}) + q - q^{-1}$$

$$\alpha^{-1} P(\overrightarrow{\nearrow}) - \alpha P(\searrow) = (q - q^{-1}) P(\uparrow \uparrow)$$

Graphical Model (MOY)

$$P(\overrightarrow{\nearrow}) = \alpha q P(\uparrow \uparrow) - \alpha P(\overrightarrow{\searrow})$$

$$P(\searrow) = (\alpha q)^{-1} P(\uparrow \uparrow) - \alpha^{-1} P(\overrightarrow{\searrow})$$

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