



Chern-Simons Perspective

$$Z(K, q) = \int \mathcal{D}A \left(\text{Tr}_K P e^{\oint_K A} \right) e^{\frac{K i}{4\pi} \int \text{Tr} (A \wedge dA + \frac{2}{3} A \wedge A \wedge A)}$$

$q = e^{\frac{2\pi i}{K+N}}$ (N of SU(N))

Related to coloured HOMFLY, ...
here "q" is q^N .

Restricts to the Jones polynomial...

Coloured Jones

I'm tired of

$$\text{Jones}_n(K, q) = J_n(K, a=q^2, q)$$

$$\underset{q^n = x \text{ fixed}}{\underset{n \rightarrow \infty}{\sim}} \exp\left(\frac{1}{h} S_0(x) + h S_1(x) + h^2 S_2(x) + \dots\right)$$

Related to the volume of the knot

"Volume conjecture"

$$S_0(x) = \int \log y \frac{dy}{y}$$

$A(x, y) = 0$

Quantum Volume Conjecture

$$\begin{aligned} &\uparrow \hat{A}(x, y, q) \text{ Jones}_n = 0 \quad (\text{recursion relations}) \\ &\hat{y} \hat{x} = q \hat{x} \hat{y} \quad \hat{x} \text{ Jones}_n = q^n \text{ Jones}_n \\ &\downarrow \hat{y} \text{ Jones}_n = \text{Jones}_{n+1} \\ &\text{"The AJ conjecture"} \\ &\text{Conjecture} \quad \lim_{q \rightarrow 1} \hat{A} = A \end{aligned}$$

Example For 3_1 , $A(x, y) = (y-1)(y+xc^3)$

univalent part