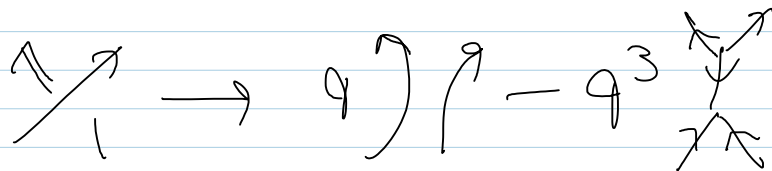


Skein Theory: "Pivotal categories from the perspective of generators and relations"  
Intimidation.

Example:



Quantum Knot invariants for SU(3)

mod  $\bigcirc = q + 1 + q^{-1}$

$\bigcirc = (q + q^{-1})$

=

Constructing exotic subfactors

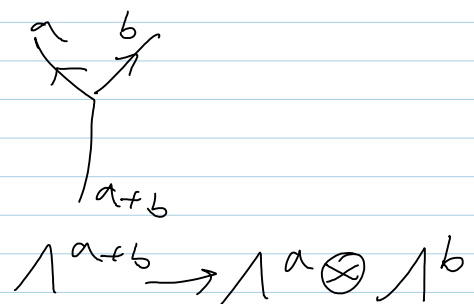
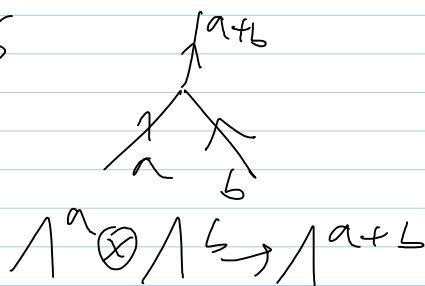
Haagerup subfactor

Extended Haagerup subfactor

A skein theory for Rep U<sub>q</sub> sl<sub>n</sub> via skew Howe duality. The full subcategory generated by

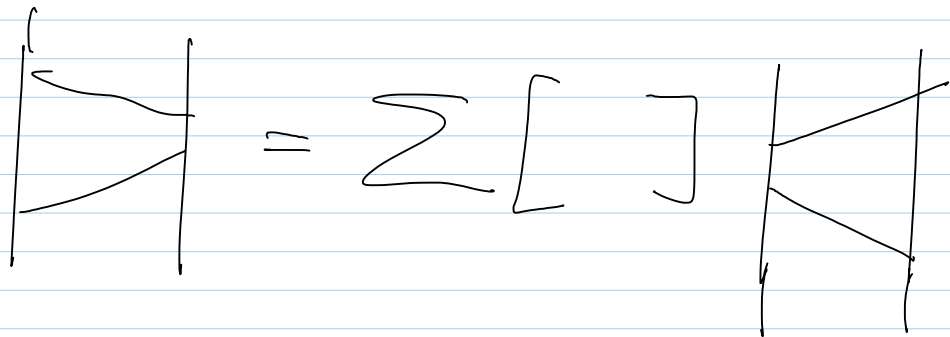
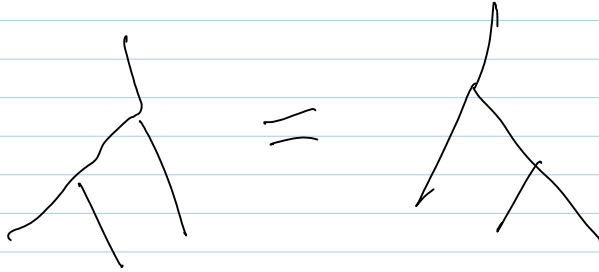
edges: oriented labelled  $0, \dots, n$  ( $\Lambda^k \mathbb{C}^n$ )

vertices



# Relations

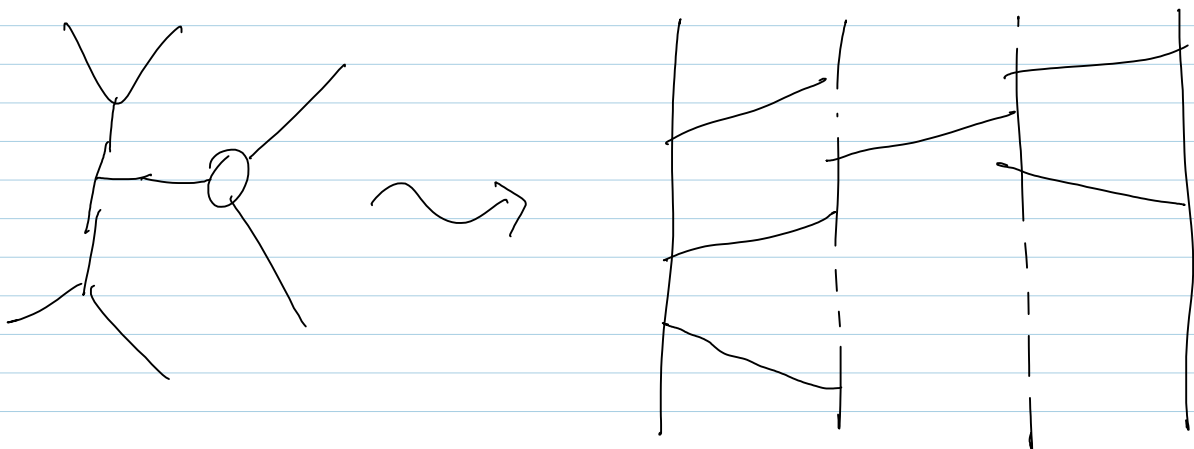
$$\begin{array}{c}
 \nearrow a+b \\
 \circlearrowleft \\
 \searrow a+b \\
 \rightarrow b
 \end{array}
 =
 \begin{bmatrix}
 a+b \\
 a
 \end{bmatrix}
 \nearrow a+b$$



Known since MOY...

Thm Any morphism is represented uniquely by a l.c. of diagram.

Idea Using isotopy & rels, any diagram can be brought to ladder form:



These rings behave exactly as the  $E_i^{(a)}$  &  $F_i^{(b)}$  for  $U\mathfrak{sl}_m$ .

---

Skew Howe duality:

$$GL(m) \subset \Lambda^0(\mathbb{C}^m \otimes \mathbb{C}^n) \supset SL(n)$$

the two actions generate each other's commutants.

$$\Lambda^k(\mathbb{C}^m \otimes \mathbb{C}^n) \dots$$