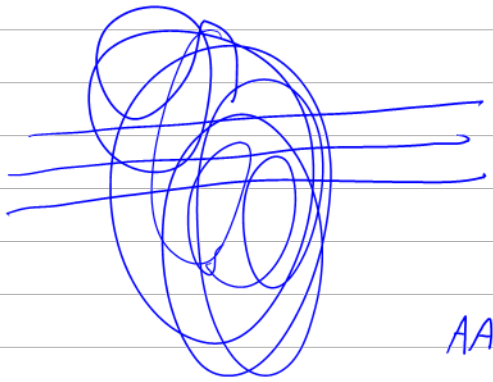
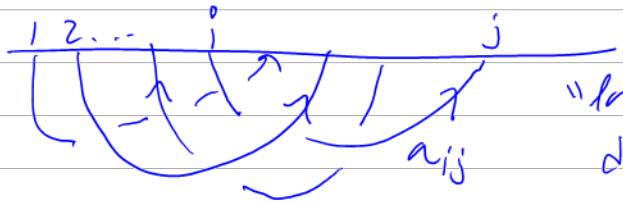
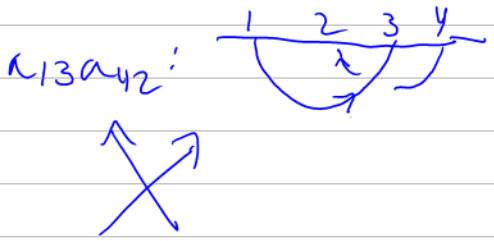
$a^{\vee} T_i - a^{-1} T_i^{-1} = z$





"layered descending"

AA_d: "Arc Algebra": $FA\langle a_{ij} \rangle / rels$



stupid relations: $a_{ij}a_{jk} = 0$ etc.

Let $v(a_{ij}, a_{kl}) = v$ be the intersection # of a_{ij} & a_{kl}

$$a^{v} a_{ij} a_{kl} - a^{-v} a_{kl} a_{ij} = z v\, a_{il} a_{kj}$$

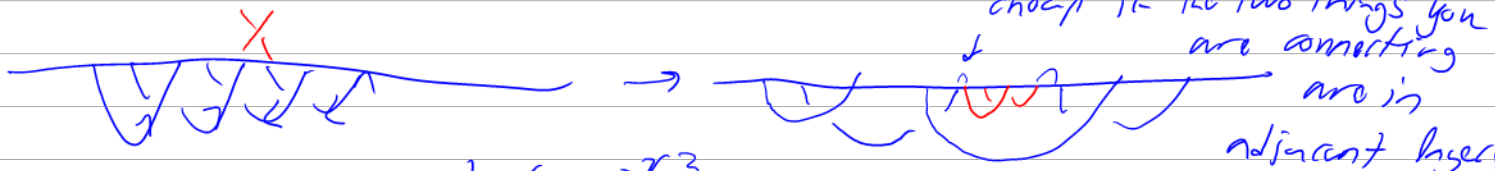
The Homfly relation

d:  w - up arrows w: down arrows.

$$: \sum_{k=0}^{w} \binom{w}{k} \cdot \binom{w}{k} k!k! = \sum_{k=0}^{w} \frac{(w!)^2}{(k!)^2} \leq (w+1)(w!)^2 \qquad w \sim \sqrt{n}$$

# of products.

$\dim AA_d \sim w!$ Bringing an element to canonical form takes $\sim (w!)^2$ operation



cheap if the two things you are connecting are in adjacent layers.

cost: $(w!)^{2^3}$