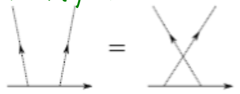
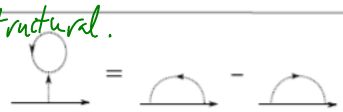
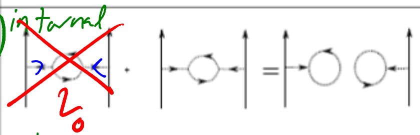
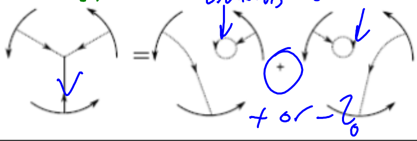
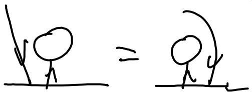
Some relations by Jana

July-12-10
6:23 PM

From page 57 of Archibald's thesis:

| Relations on Arrow Diagrams | | |
|---|---|---|
| Tails Commute<br>Our proof p. 76 | (1) non-internal, but re-statable as internal<br> | A consequence of being a welded knot invariant |
| Directed No Internal Vertices<br>Our proof p. 76 | (2) internal<br> | "commutators commute" …implied by (5), see below. |
| Single Blobs | (3) structural.<br> | This one legged 'blob' would be 0 if it where a chord diagram. |
| Directed Blob Cutting<br>Our proof p. 77 | (4) internal<br> | A version of ~~Blob~~ b cutting for arrow diagrams |
| A Y Relation<br>Our proof p. 77 | (5) internal.<br>clockwise or counter?<br><br>+ or −? | A directed version of the $H$ relation becomes a $Y$ relation. |

Should also have:



(though it is automatic in $\mathcal{A}^v$)

I have to investigate the possibility that this is wrong due to framing correction issues.

**Question** Could we have "guessed" relation (5) on a-priori grounds, with no knowledge of Jana's pf, as being the carrier of the essence of $uA$?
(really, co-carrier) (non-group-like)

This is important, for in the future we will want to find similar relations for other quotients of $\mathcal{A}^v$.

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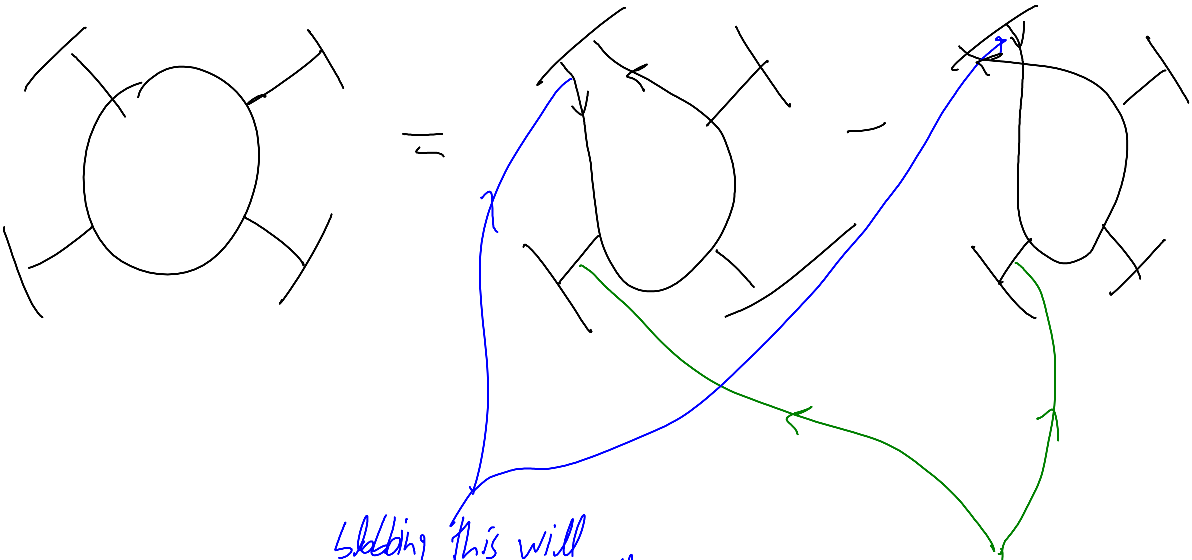
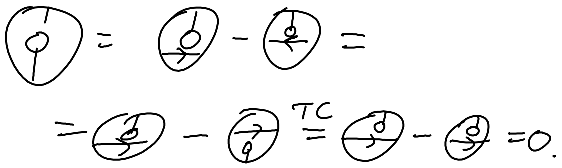
$\Longrightarrow$ Any $n$-wheel on any skeleton can be cut into $n$ blobs:



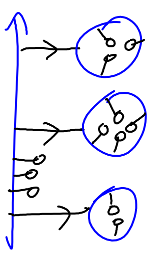
blobbing this will vanish by the centrality of blobs.

So this must be blobbed first. Now continue by induction.

But now it looks like modulo these relations, all wheels in $\mathcal{A}^w(O_n)$ vanish (as the vanish on a single component, and since wheels can be broken into blobs, and then re-assembled into monochromatic wheels, this is enough).



Could the MVA be supported on

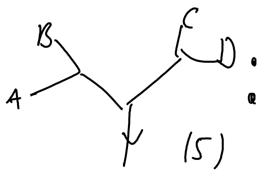


(skeletons in blue)

Or maybe the MVA is supported on struts, now that the group-like property is gone?

$[[A,B],[C,D]] =$

(5)⇒(2):



$= [aB-bA, cD-dC]$

$= (ab-ba)(cD-dC) - (cd-dc)(aB-bA)$

$= 0 - 0 = 0$