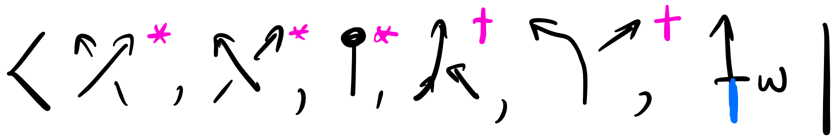
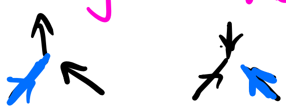
$wTF = CA\langle$ 

$R1^s, R2, R3, R4, OC, CP, FR, W^2, CW, TV \;\Big|$

$S_e, A_e, u_e, d_e \rangle$

* also any strands could be blue

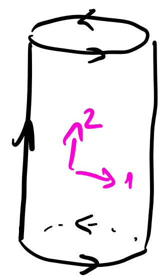
† any combo of black/blue & all orientations e.g.



etc.

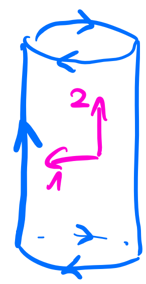
Tubing map

"blackboard orientation"



counter-clockwise

"opposite blackboard orientation"

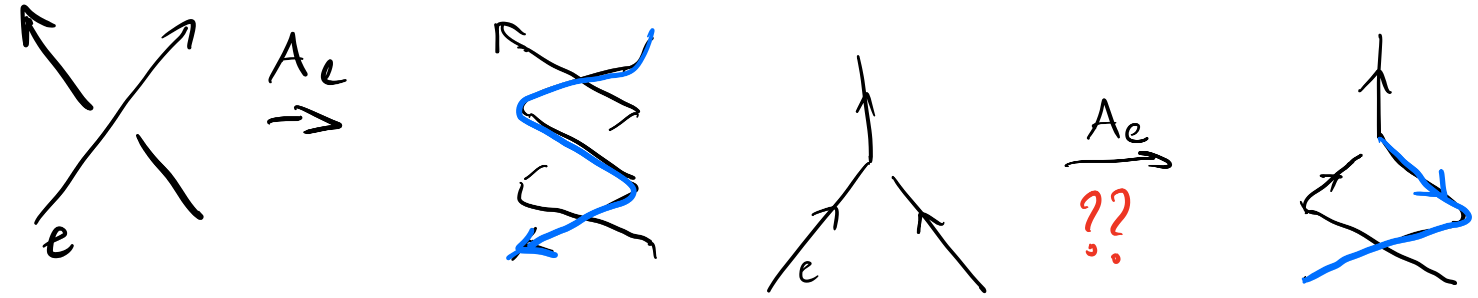


clockwise

A web always has black on one side, blue on the other.

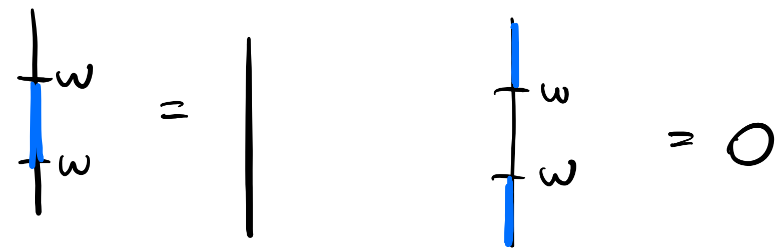
Adjoint operation: reverses arrow + colour

Tricky when done the "over" (flown-through) strand:

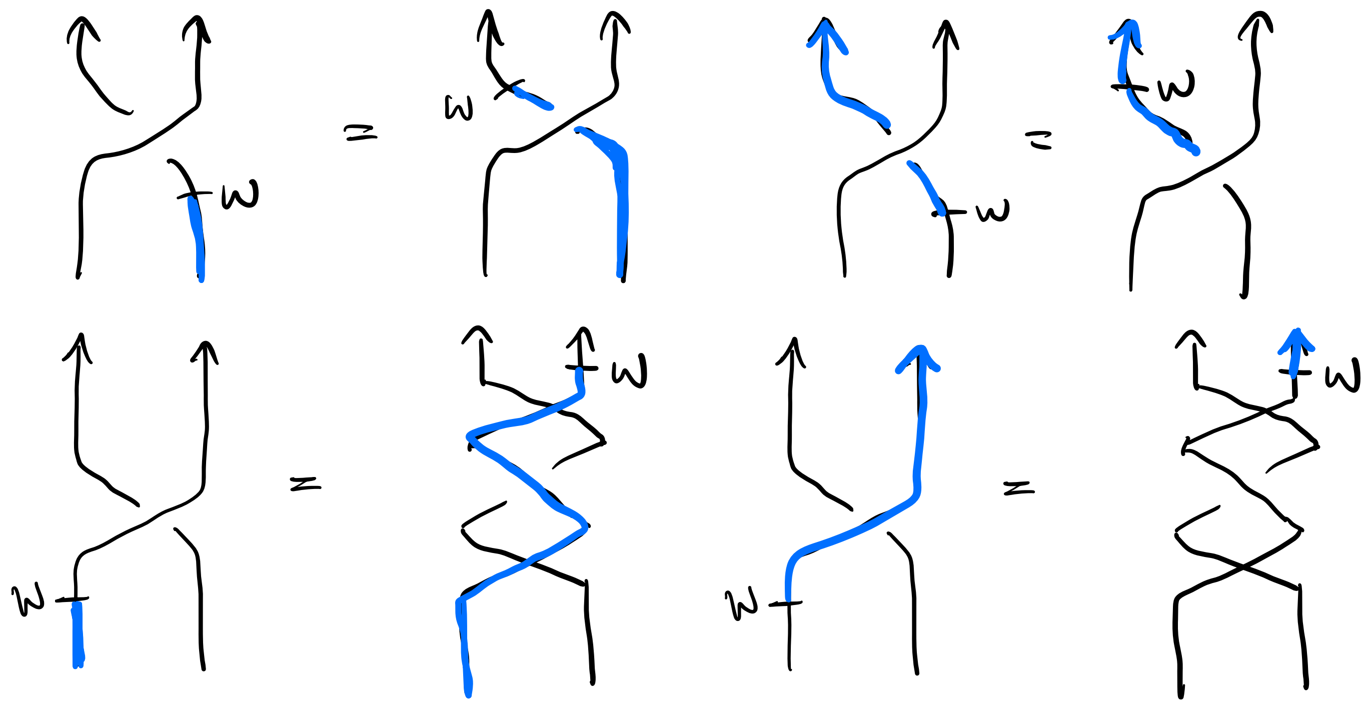


Relations:

W^2

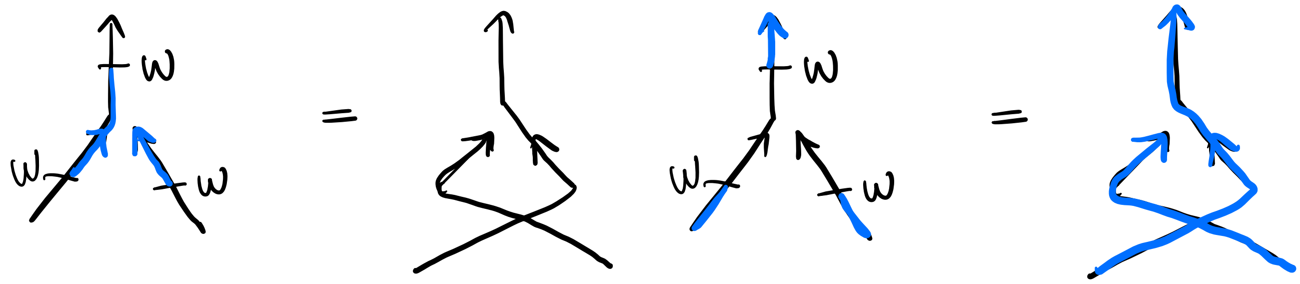


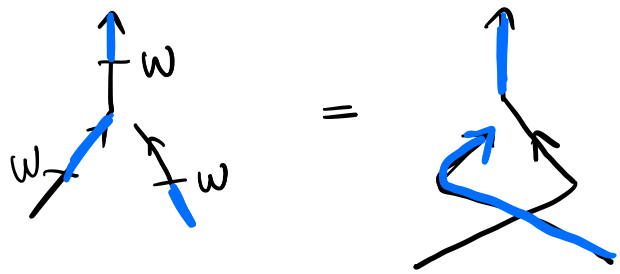
FR



CW

TV :



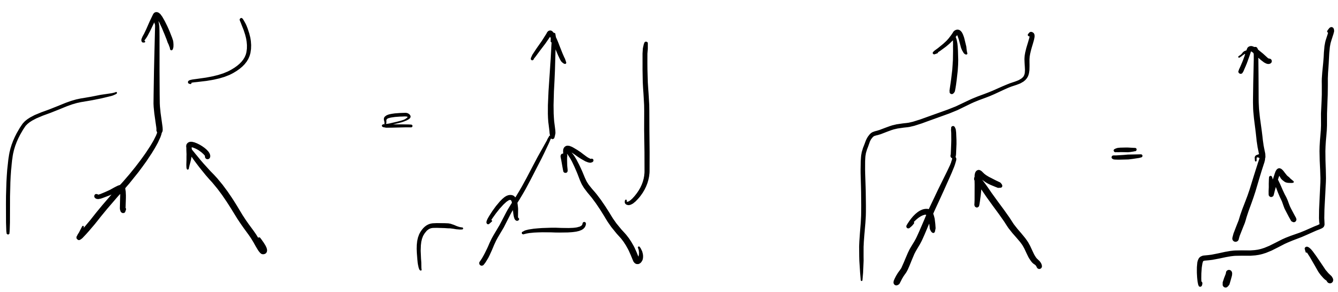


(right?)

and all other blue/black combos

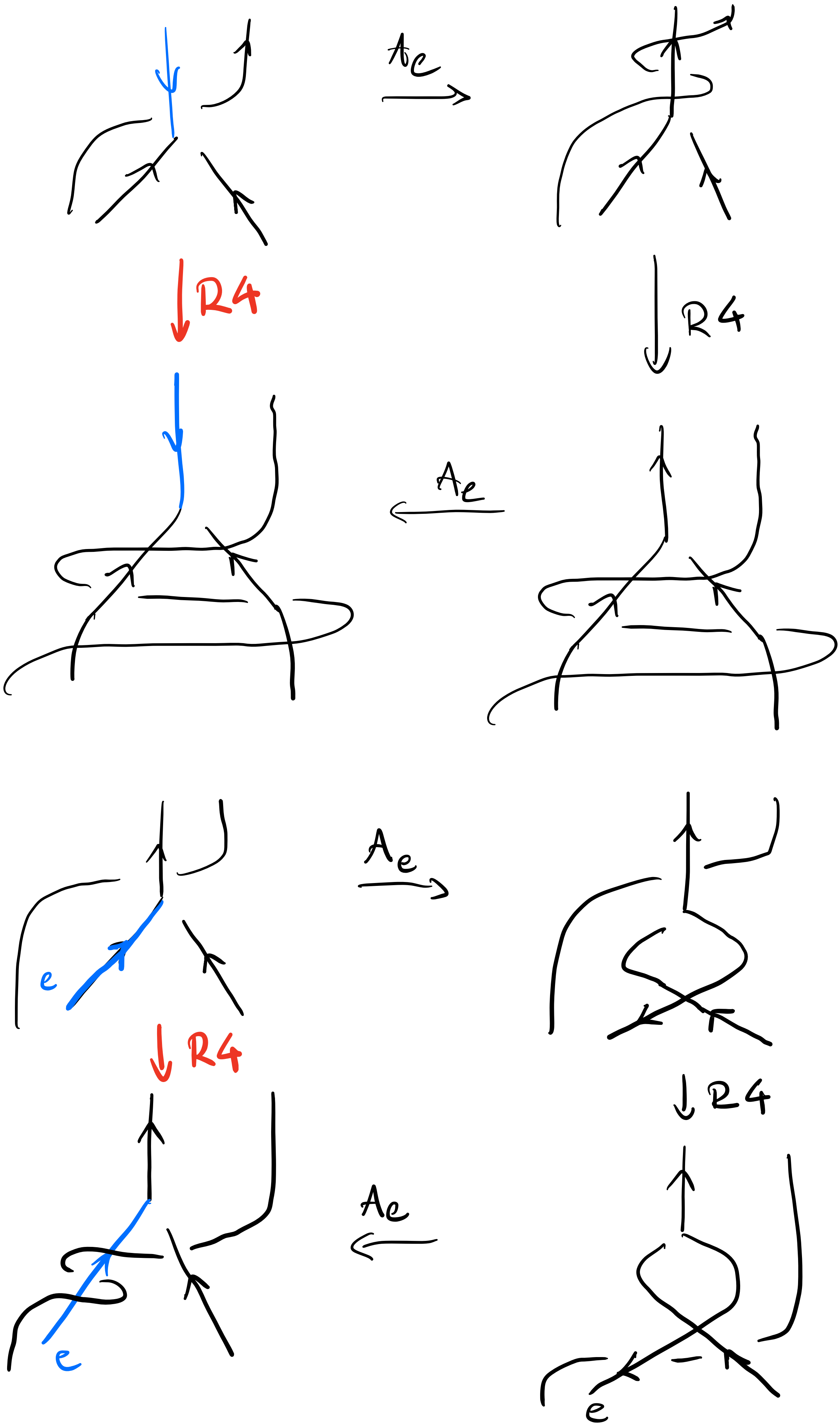
R4 for vertices of different orientations:

Easy case: it's all black

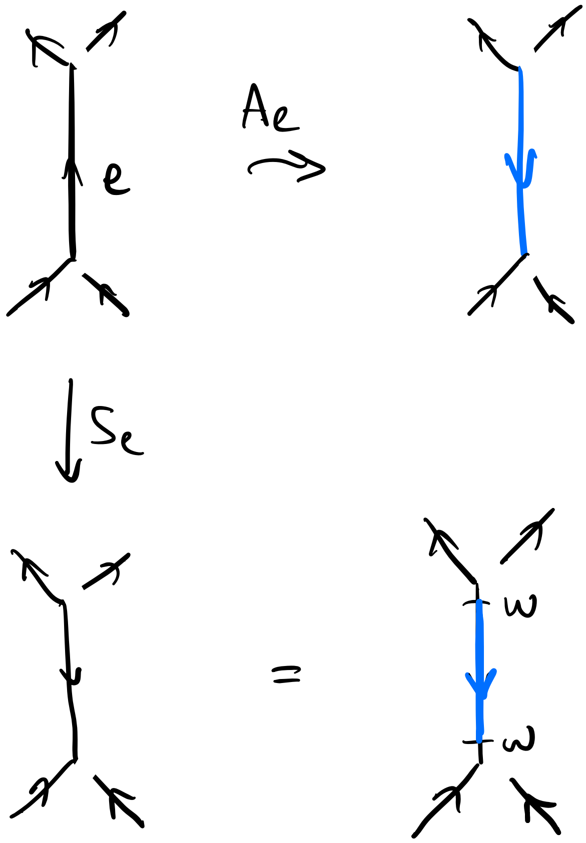


If there are blue strands, the corresponding R4 relations can be deduced from the A_c operations

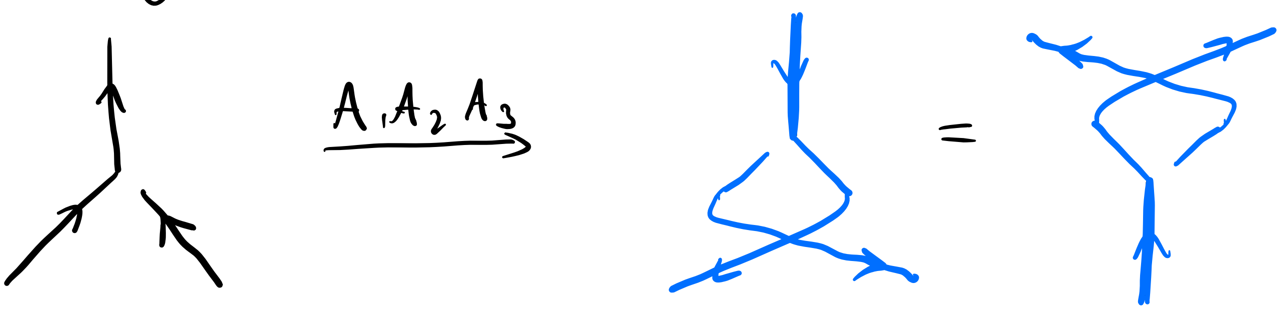
Example

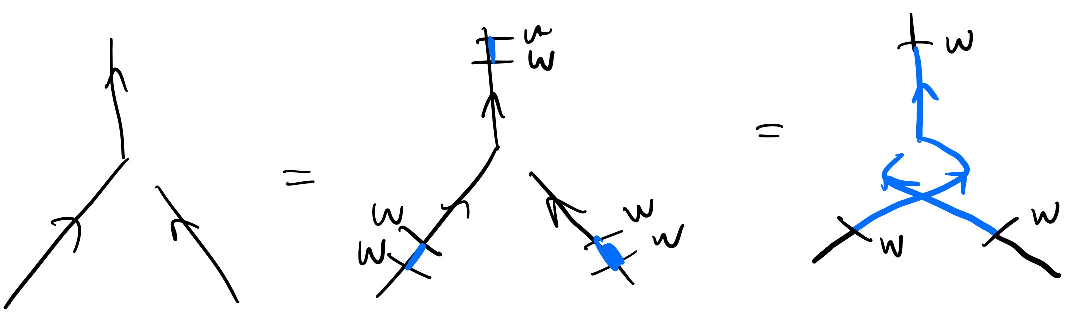


A_e
R4
R4
A_e
A_e
e
R4
R4
A_e
e
e



Unitarity

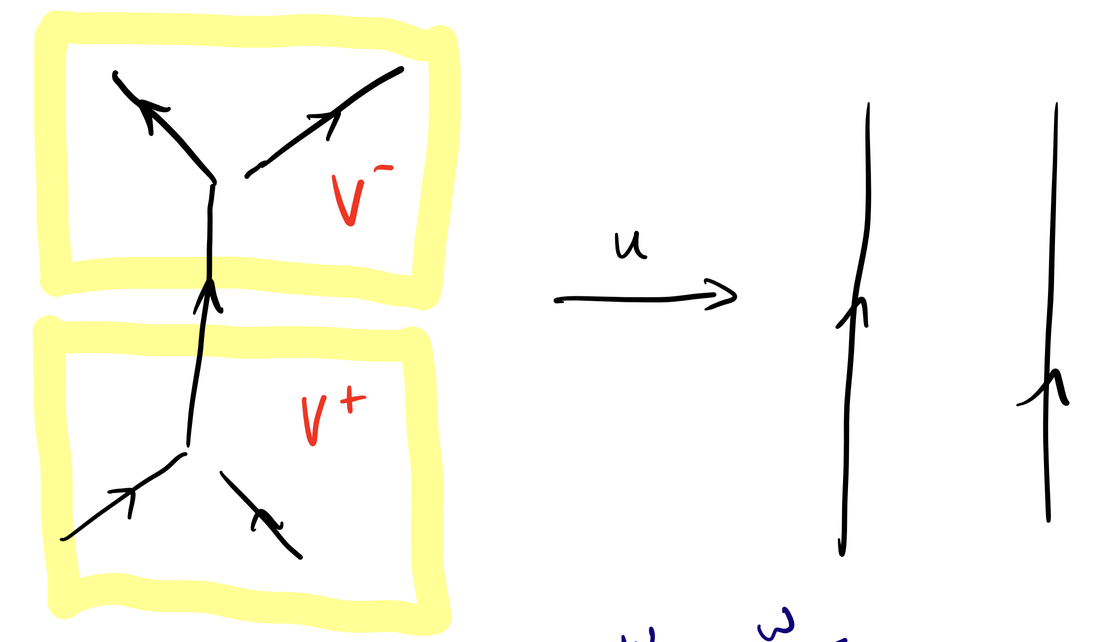


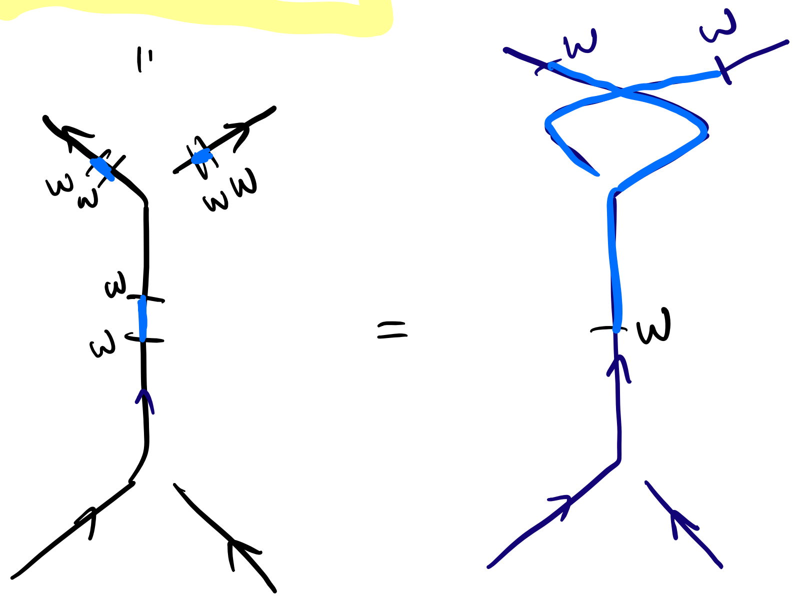


black $V^+ \xleftrightarrow{A_1 A_2 A_3}$ blue V^-

blue $V^+ \xleftrightarrow{A_1 A_2 A_3}$ black V^-

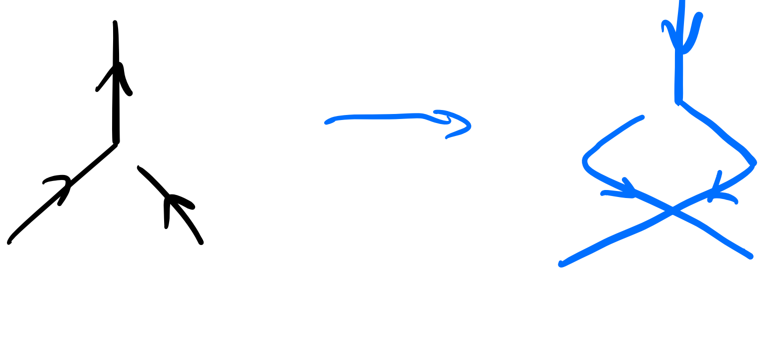
??

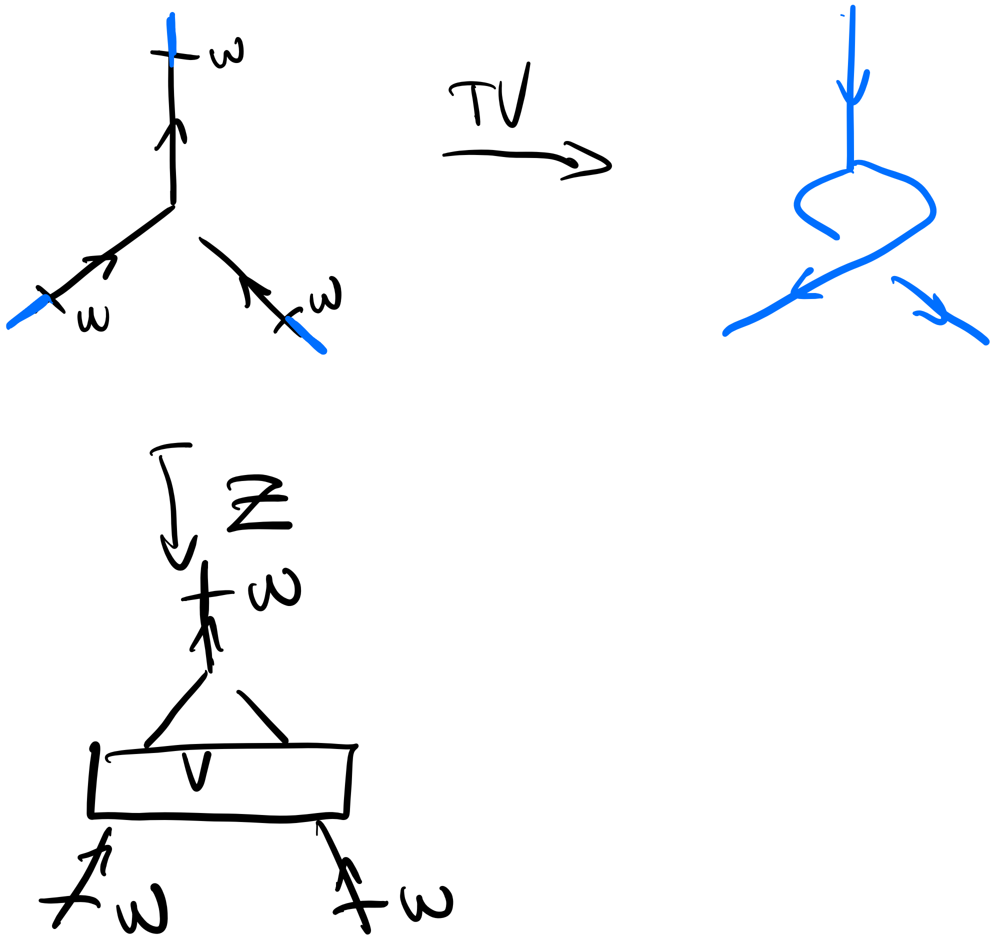


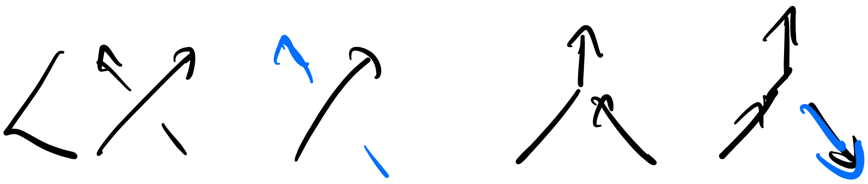


Problem $A_1A_2A_3(V)$ better not be the same as $V \cdot W^3$

$A_1A_2A_3(V)$:







gens w/ all colours

operations : A_i, S_i, U_i

relations for all colours & oris

relations of the form "what do we get when we apply each operation to each generator"

Is there an operation that just switches the colour of the whole forum?