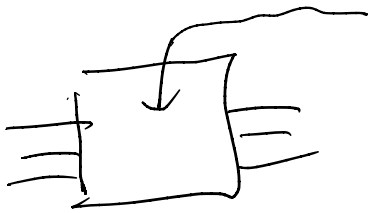
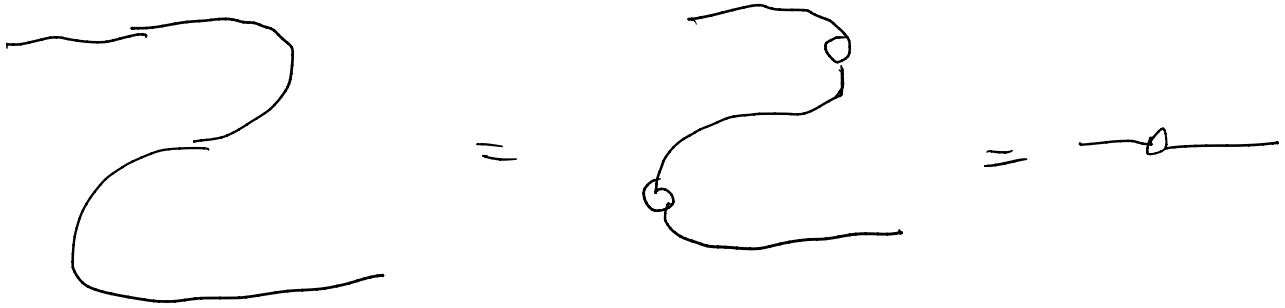
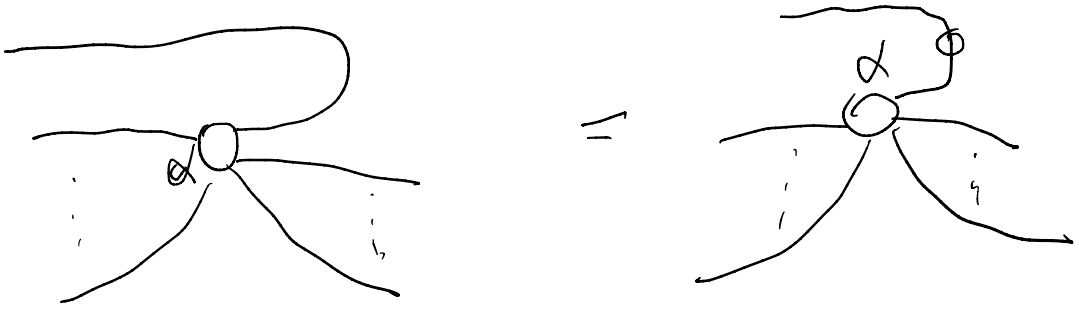
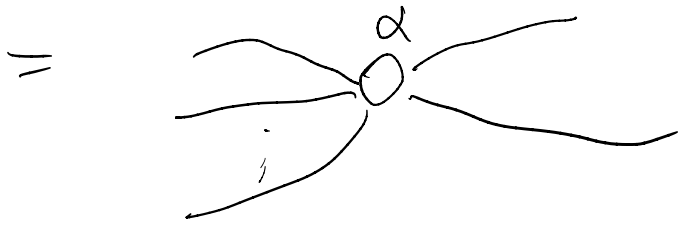
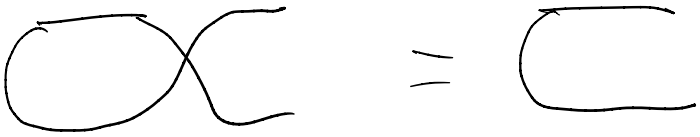
* structural maps allows us to bend wires however we like.

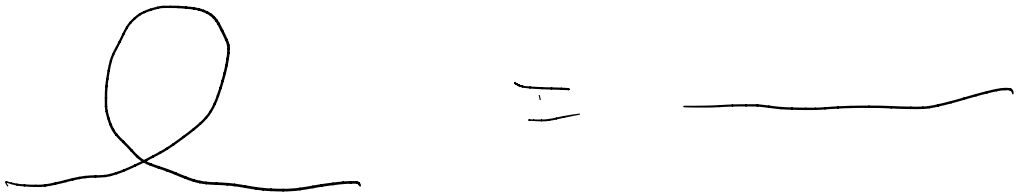


① 

② 



③ 

④ 

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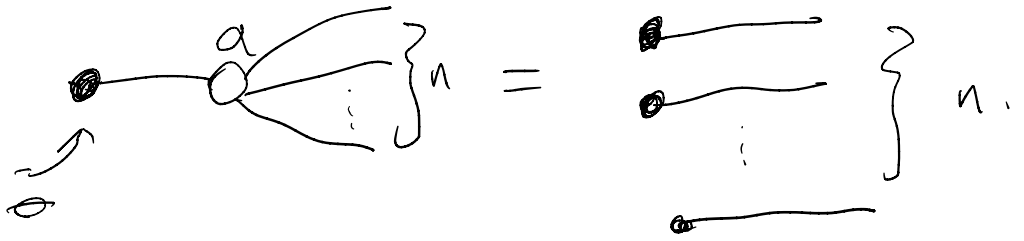
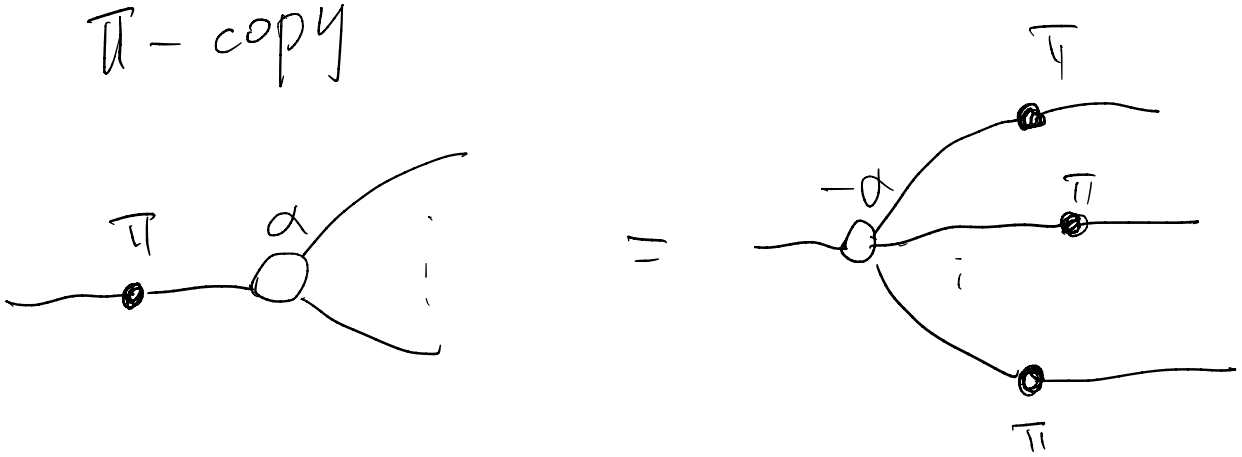


$$(|0\cdots0\rangle\langle 0| + e^{i\alpha}|1\cdots1\rangle\langle 1|)\,|0\rangle$$

$$= |0\cdots0\rangle.$$

* π - copy



So $e^{-i\alpha}$ LHS = RHS

$$\text{LHS} = (|0\cdots0\rangle\langle 0| + e^{i\alpha}|1\cdots1\rangle\langle 1|)\cdot X$$

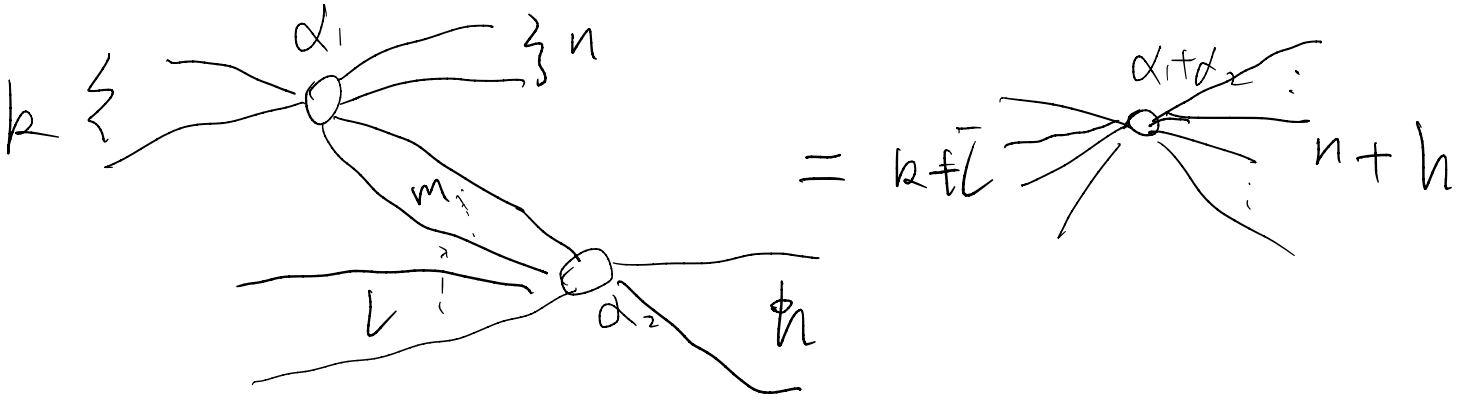
$$= |0\cdots0\rangle\langle 0|\cdot X + e^{i\alpha}|1\cdots1\rangle\langle 1|\cdot X$$

$$= |0\cdots0\rangle\langle 1| + e^{i\alpha}|1\cdots1\rangle\langle 0|$$

$$\text{RHS} = (X\otimes\cdots X)(|0\cdots0\rangle\langle 0| + e^{-i\alpha}|1\cdots1\rangle\langle 1|)$$

$$= |1\cdots1\rangle\langle 0| + e^{-i\alpha}|0\cdots0\rangle\langle 1|$$

* Spider fusion.



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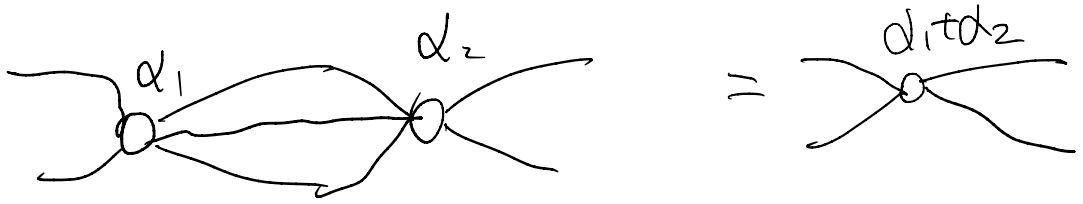
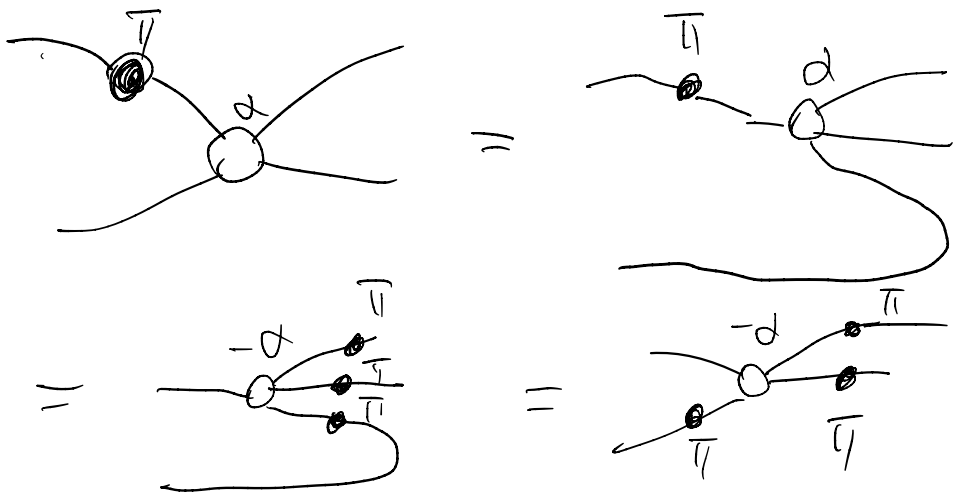


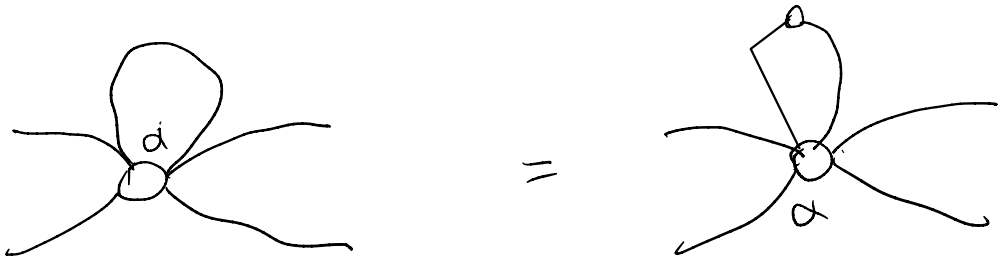
$$\left(|0\rangle\langle 000| + e^{i\alpha_2}|111\rangle\langle 111|\right)\left(|000\rangle\langle 001| + e^{i\alpha_1}|111\rangle\langle 111|\right)$$

$$= |00\rangle\langle 00| + e^{i(\alpha_1+\alpha_2)}|11\rangle\langle 11|$$

Note:

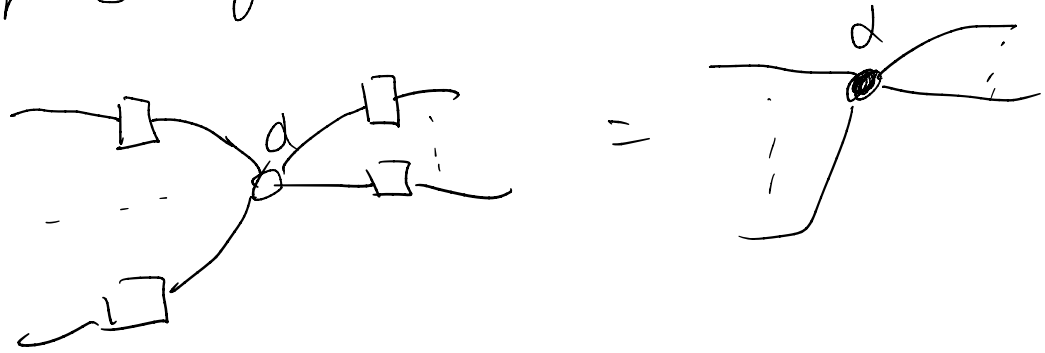


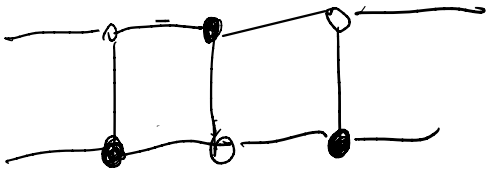
(3)



* Some obvious rules:

color changing

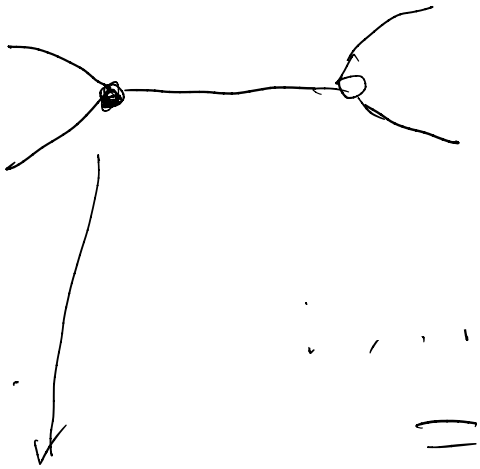




???

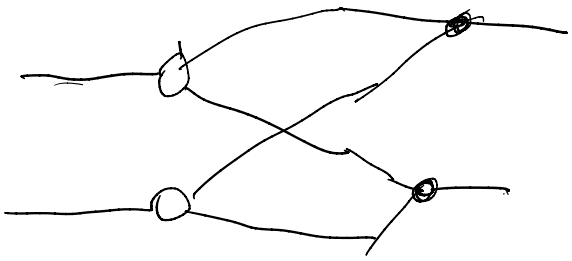
* bialgebra rule

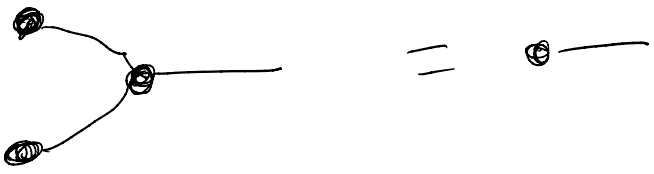
copy

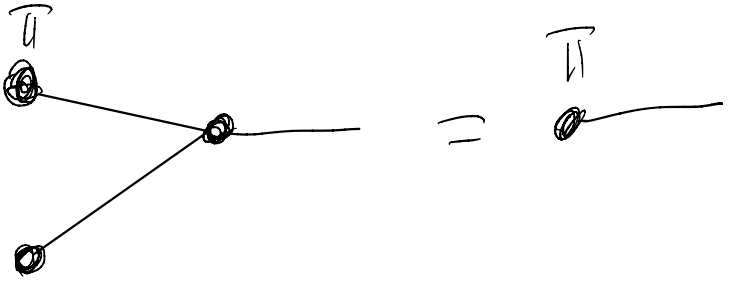


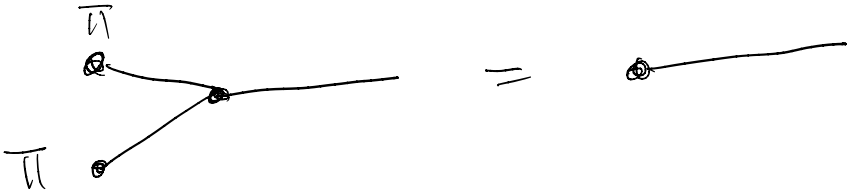
xor

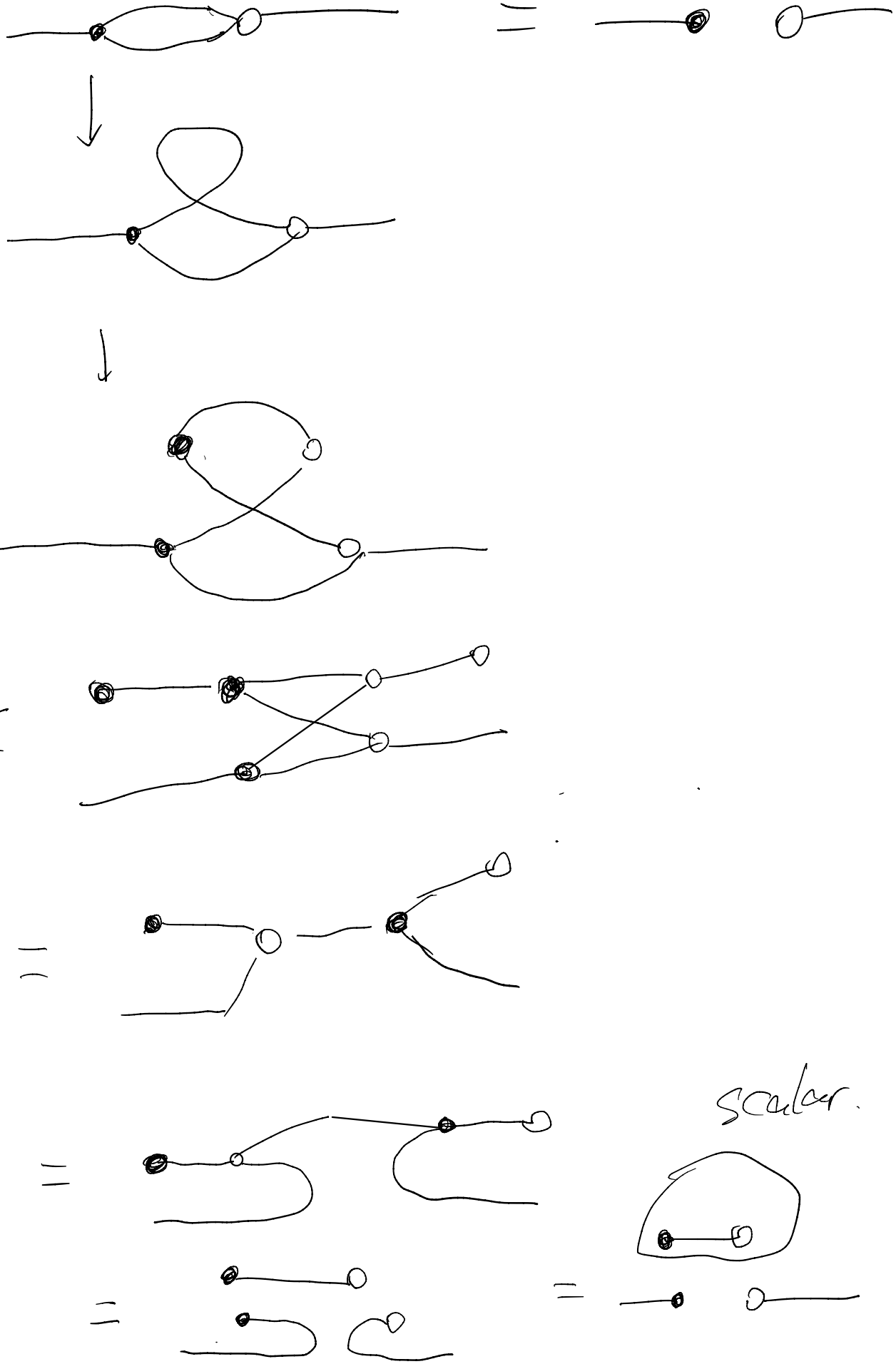
=










scalar.