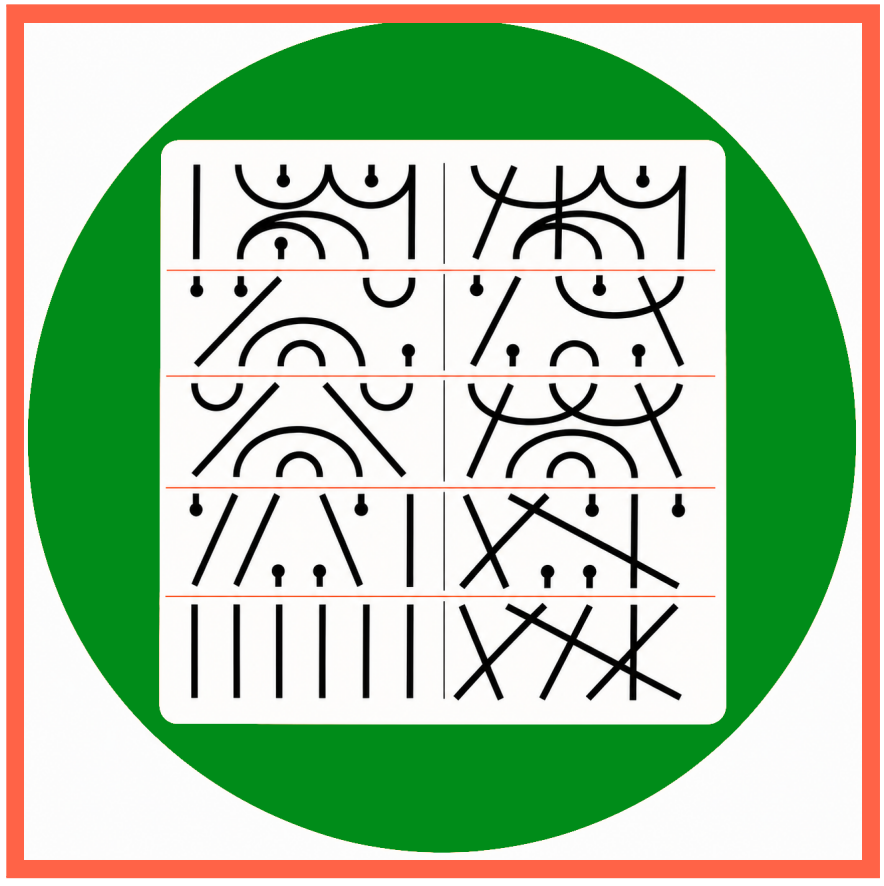
Diagram algebras - part 4

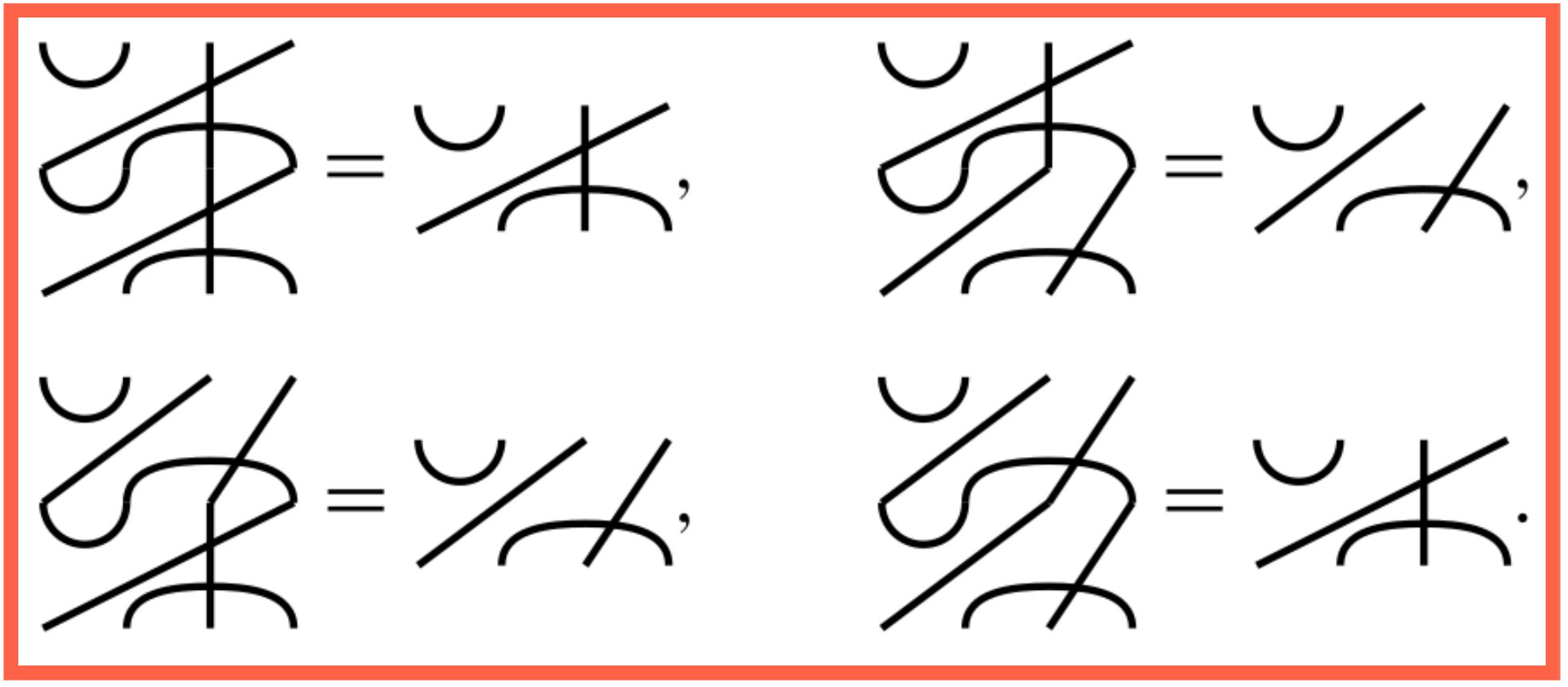
Or: The diagram category zoo

One machine, many species



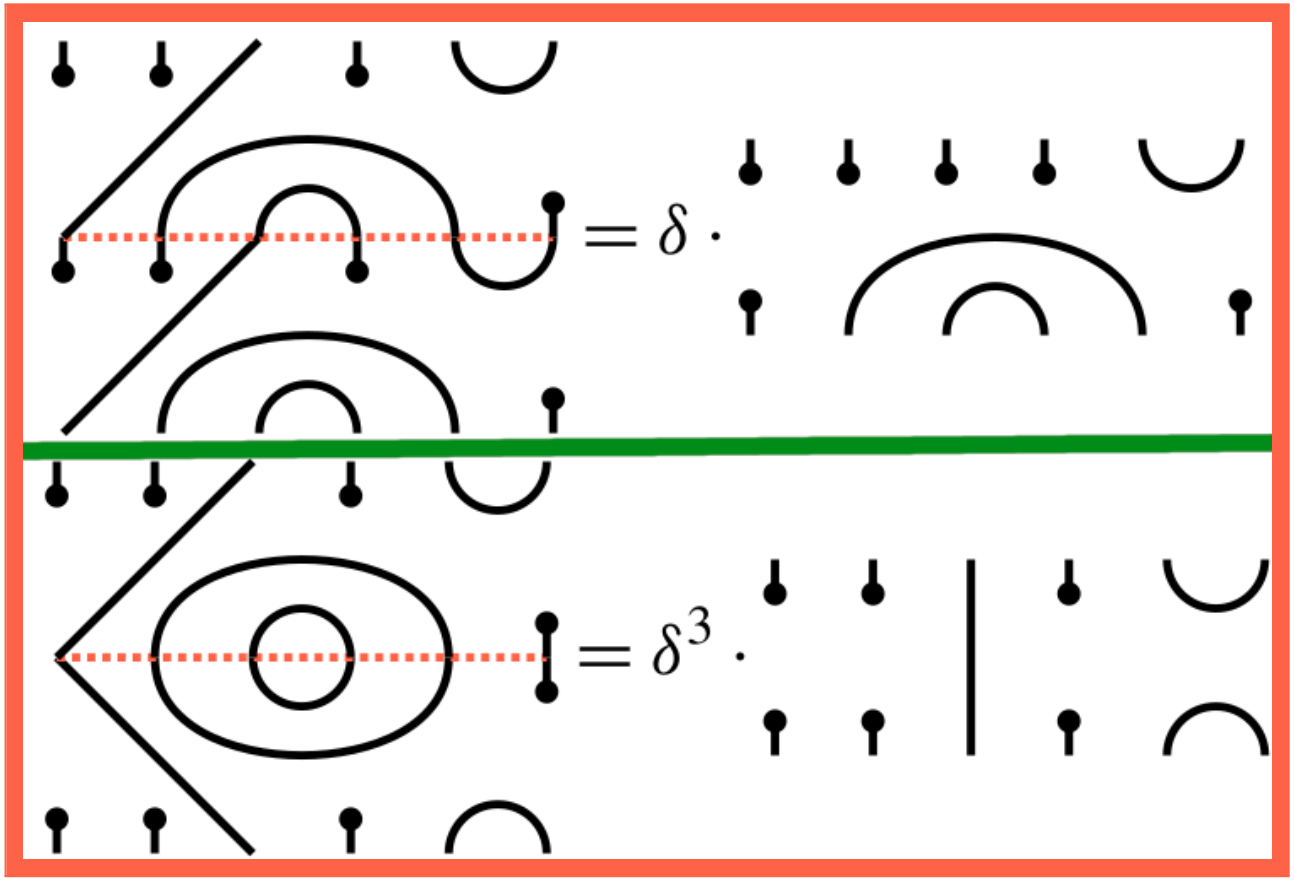
- Rule First choose which pictures are allowed in your category
- Product Multiplication is still stacking and simplifying the middle
- Zoo Different choices give TL, Brauer, partition, rook, Motzkin, and more

Three familiar animals



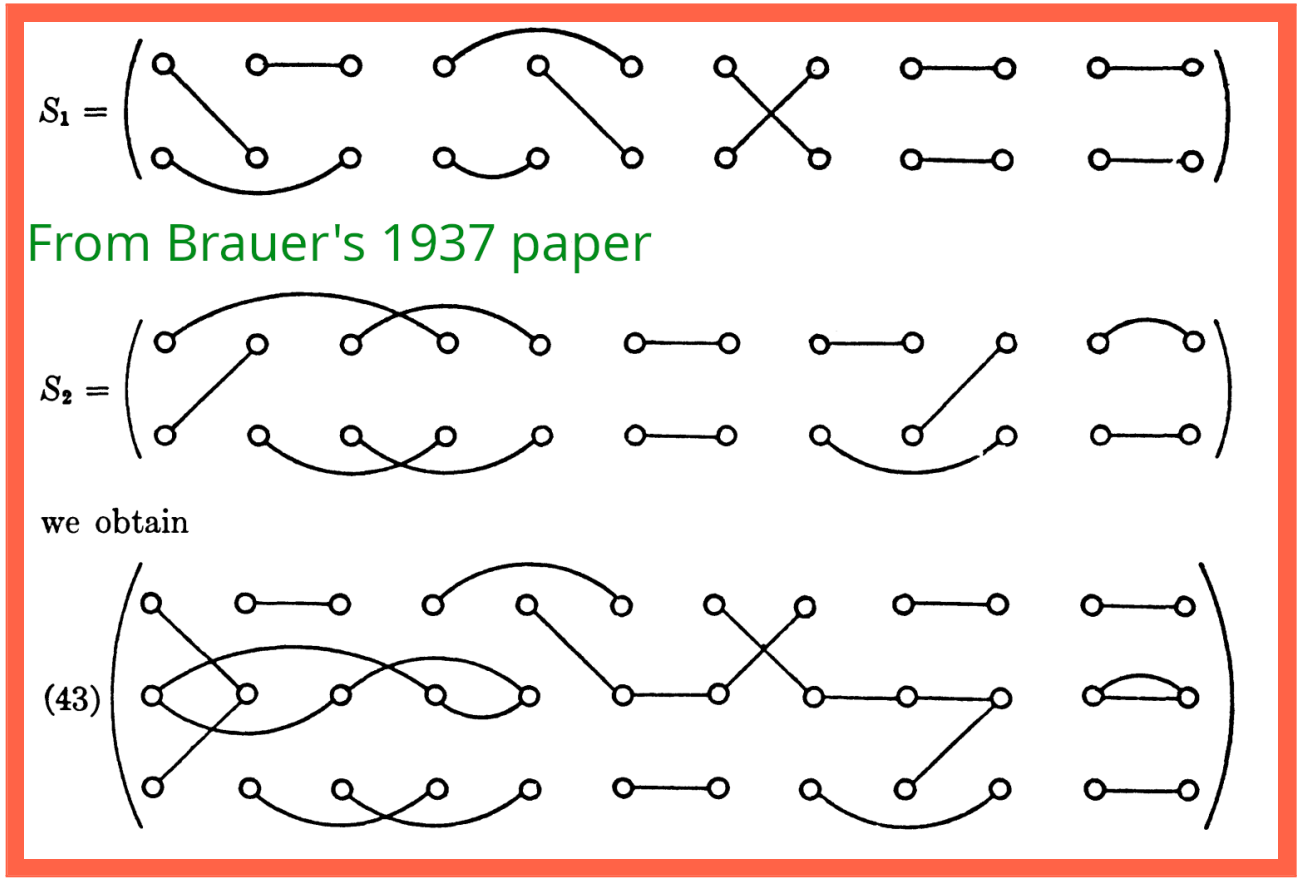
- TL Planar pairings: cups, caps, through-lines, but no crossings
- Brauer Pairings with crossings: symmetry can move strands around
- Partition Blocks can connect many points at once, not just pairs

Smaller, partial, planar



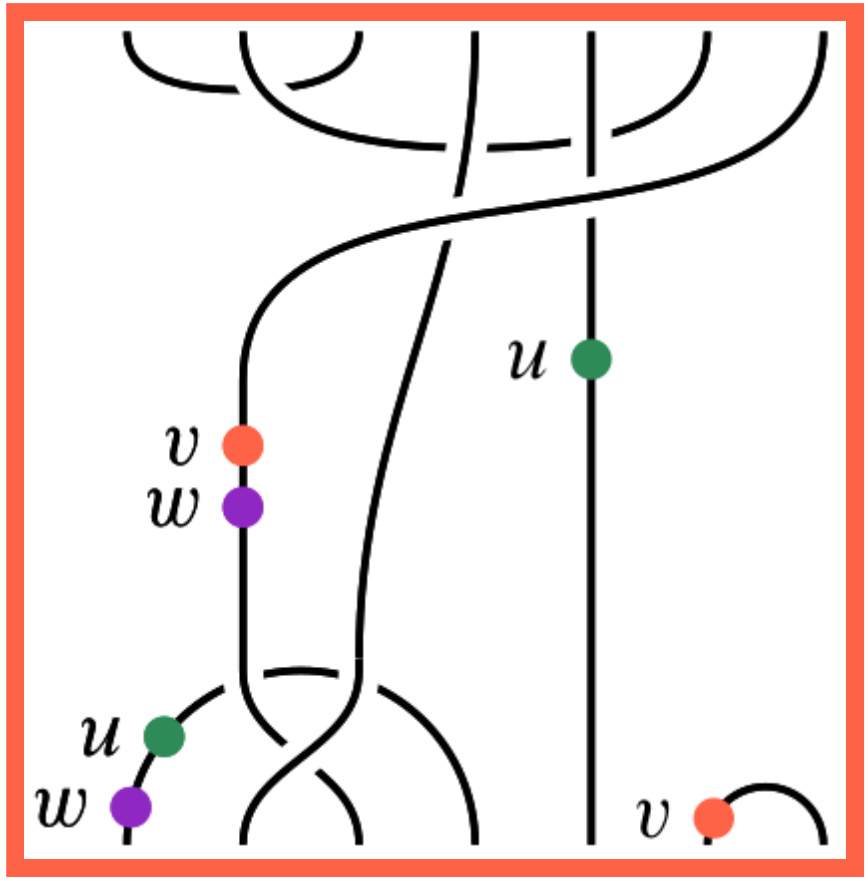
- Rook Some points are simply not connected, like partial permutations
- Motzkin Pairings plus lonely points, a fancier version of Temperley–Lieb
- Planar versions No crossings

Storytime: discovered, not invented



- TL Rumer–Teller–Weyl pictures; then physics, knots, subfactors
- Brauer Pairings for classical invariant theory: orthogonal and symplectic
- Partition Potts-model symmetries; blocks remember grouped spin states

How to recognize a diagram animal



- Allowed pictures Crossings? Big blocks? Missing points? Decorations?
- Loop rules What closed pieces turn into numbers when you stack?
- Key Not just "I can do it" but also "It appears somewhere"

Thank you for your attention!

I hope that was of some help.