A-arrow spaces

August-05-08
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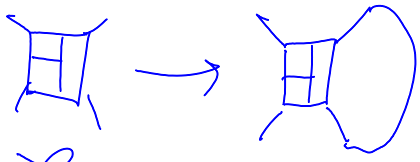
<u>Question</u> what are all $\vec{\mathcal{A}}$ spaces worth computing?

For $\mathcal{A}$, the answer is $\mathcal{A}(\Gamma)$ for every graph Γ, and these are all isomorphic to $\mathcal{A}(\bigcirc_k \uparrow_l)$.

A bit more (though it excludes link relations) is the representation $\mathcal{G}_K$ for every K.

A bit more is to include all disjoint union operations of uni-trivalent graphs, and all capping ops



$\mathcal{G}_4 \longrightarrow \mathcal{G}_2$

<u>Note</u> These spaces and maps all have surface (M_l) analogs.

The arrow analog should be

* Determine all representations $\vec{\mathcal{G}}_{K,l}$, with K incoming and l outgoing arrows.

* Determine all disjoint union ops.

* Determine all contraction ops

$$\vec{\mathcal{E}}_{k,l} \longrightarrow \vec{\mathcal{E}}_{k-1,l-1}$$

* Determine the map

$$\alpha : \mathcal{E}_r \longrightarrow \bigoplus_{k+l=r} \vec{\mathcal{E}}_{k,l}$$

[Is there a "duality" $\vec{\mathcal{E}}_{k,l} \to \vec{\mathcal{E}}_{l,k}$]

All should have surface analogs!