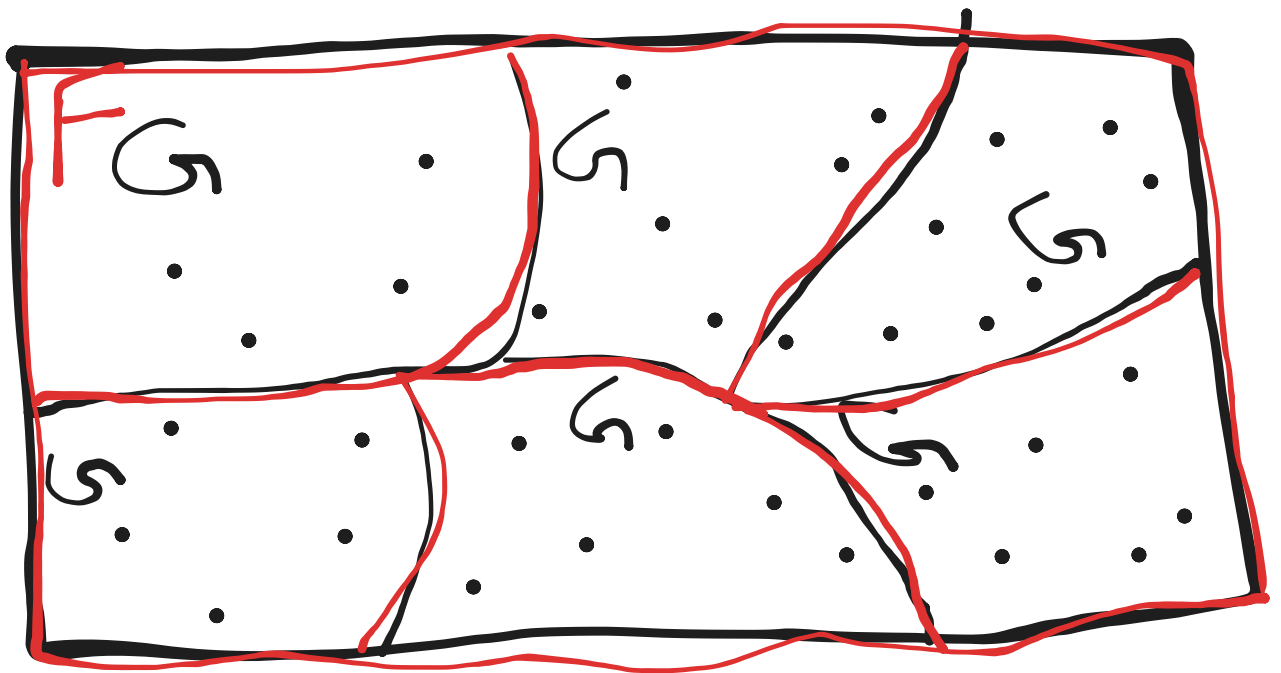
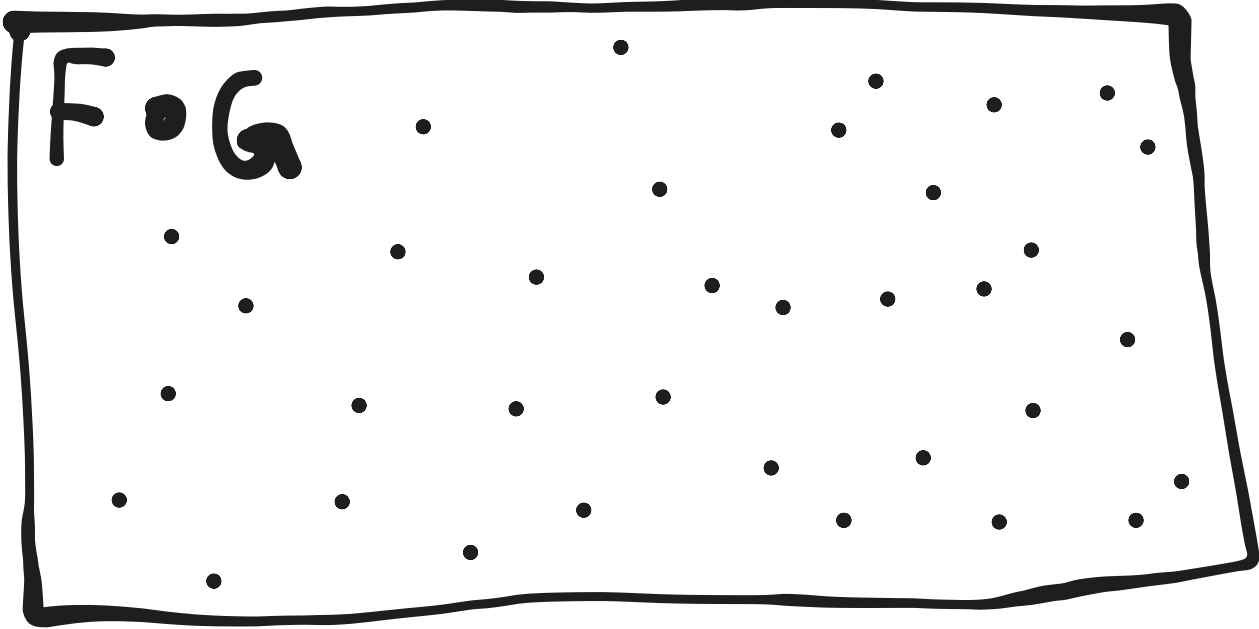


Substitution of species

Definition

$$\begin{aligned}
 F, G : \text{Combinatorial structure} \ni G[\emptyset] &= \emptyset \\
 \Rightarrow F \circ G &= \sum_{\pi \in \text{Par}[U]} F[\pi] \times \prod_{p \in \pi} G[p] \\
 &= \{(\pi, \phi, \gamma) : \text{Par}[U] \times F[\pi] \times (\gamma_p)_{p \in \pi}\} \\
 Z_{F \circ G}(x_i)_{i \in \mathbb{N}} &= Z_F(Z_G(x_{k \cdot i})_{i \in \mathbb{N}})_{k \in \mathbb{N}} \\
 \widetilde{F \circ G}(x) &= Z_F(\tilde{G}(x^i))_{i \in \mathbb{N}} \\
 F \circ G(x) &= F(G(x)) \\
 \mathbf{F} \circ \mathbf{G}
 \end{aligned}$$



This is also called an F -assembly of G -structures.

Example

$$\mathcal{E}nd[U] \subseteq \{F : U \longrightarrow U\}$$

$$\mathcal{E}nd[U] \cong \mathcal{S} \circ \mathcal{A}$$

