

Definition (Loop operator \dagger)

For a map $h : \mathbf{F}_1 \times \mathbf{F}_2 \rightarrow \mathcal{AR}$, define

$$h^\dagger : \mathbf{F}_1 \rightarrow \mathcal{AR},$$

$$f_1 \mapsto \text{lfp} \left(\Psi_{f_1}^h \right),$$

where lfp is the least-fixed point operator, and $\Psi_{f_1}^h$ is defined as

$$\Psi_{f_1}^h : \mathcal{AR} \rightarrow \mathcal{AR},$$

$$R \mapsto \text{Min}_{\leq_R} \bigcup_{r \in R} h(f_1, r) \cap \uparrow r.$$