

THE EXTENSION FUNCTOR DEFINED ON THE CATEGORY OF CLOSURE OPERATORS OF A SET.

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Let S be a fixed set. Let Res be the category of residuated maps between complete lattices. Let $\text{End}(\text{Res})$ be the category of endofunctors of Res . Let $\text{Clos}(S)$ be the category of closure operators of S . Let us define a functor E from $\text{Clos}(S)$ to $\text{End}(\text{Res})$.

For each closure operator $a: \mathcal{P}(S) \rightarrow \mathcal{P}(S)$, the endofunctor E_a is defined (for an arrow $r: P \rightarrow Q$) by

$$(E_a(P) = \{v \in P^S / \forall X \subset S, \Lambda(v(X)) = \Lambda(v(\bar{X}))\}) \text{ and}$$

$(E_a(r))(v) = \Lambda(w \in E_a(Q) / rv \leq w)$. For an arrow $a \subset b$ of $\text{Clos}(S)$, let us define a functorial morphism: $\lambda_{ab}: E_a \rightarrow E_b$ by

$$\lambda_{ab}(P): v \mapsto \Lambda(w \in E_b(P) / v \leq w).$$

Whenever the valuation set is a complete lattice L with $0 < 1$, the **fuzzified closure structure** of (S, a) is the couple $(L^S, E_a(L))$ (the fuzzy closed subsets of S are the members of $E_a(L)$).

REFERENCES:

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