

leroy

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**Lemma 1** (Frame). *A Frame can be viewed as a Category. There exists a morphism between  $A$  and  $B$  iff  $A \leq B$ .*

**Definition 2** (Top  $\rightarrow$  Frame). There exists a contravariant Functor from a topological Space to the corresponding Frame Category with open Sets as objects.  $f : X \rightarrow O(X)$

**Definition 3.** For every continuous Function  $f : X \rightarrow Y$  between topological Spaces, there exists a pair of functors  $(f^*, f_*)$ .

$$f^* = f^{-1} : O(Y) \rightarrow O(X)$$

$$f_* : O(X) \rightarrow O(Y) := A \mapsto \bigcup_{f^*(v) \leq A} v$$