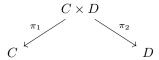
Every topology provides a complete Heyting algebra in the form of its open set lattice.

Constructions on Categories 0.1

 $C \times D$ has elements (A, B), we define $f: A \to C$ $g: B \to D$, $h: A \times B \to C \times D$ or h:(f,g)

Projections



$$\pi_1(1_A, 1_B) = 1_A = 1_{\pi_1(A, B)}$$

 $\pi_1(1_A,1_B)=1_A=1_{\pi_1(A,B)}$ Opposite Category For any category C, the opposite category is notated C^{op} . It is the same but with the arrows reversed.

Op is its own inverse

$$(C^{op})^{op} = C$$

Op preservers products, functors, and slices

$$(C \times D)^{op} = C^{op} \times D^{op}$$

$$(F(C,D))^{op} = F(C^{op}, C^{op})$$

Arrow Category

Definition 1. Monoids One object category, group without inverses Natural Numbers with addition