

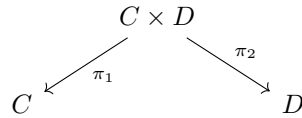
1 Misc

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

1.1 Constructions on Categories

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

Projections



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

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 preserves products, functors, and slices

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

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

Arrow Category

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