

Lecture Notes in Category Theory

Paul Ossientis

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Chapter 1

First Chapter

1.1 Adjunctions

Definition 1 We call adjunction an ordered pair (F, G) where F is a functor $F : \mathcal{C} \rightarrow \mathcal{D}$ and G is a functor $G : \mathcal{D} \rightarrow \mathcal{C}$ while \mathcal{C} and \mathcal{D} are two locally-small categories such that the following two functors are isomorphic:

$$\begin{aligned}\mathcal{D} \circ (F \times I_{\mathcal{D}}) &: \mathcal{C}^{op} \times \mathcal{D} \rightarrow \mathcal{Set} \\ \mathcal{C} \circ (I_{\mathcal{C}^{op}} \times G) &: \mathcal{C}^{op} \times \mathcal{D} \rightarrow \mathcal{Set}\end{aligned}$$