

Category Theory

Exercise Sheet 6

Lecture Homepage: <https://www.math.cit.tum.de/algebra/lehre/sommersemester-2022/ss2022-category-theory/>

Exercise 1. Find some more examples of representable functors on your favorite categories.

Exercise 2. Let C be a category. Show that the functor $C \rightarrow \text{Set}$ which sends every object to the empty set and every morphism to the unique map from the empty set to itself is not representable.

Exercise 3. Consider the categories $\mathbb{1}$ (resp. $\mathbb{2}$) with exactly one (resp. two) objects and only the identity morphisms, as well as the category Cat of small categories. Describe the functors $\text{Cat} \rightarrow \text{Set}$ represented by $\mathbb{1}$ and $\mathbb{2}$.