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## **1. The category of abelian groups**

Properties of abelian groups (and modules over a commutative ring) will be considered by describing them in terms of homomorphisms (and not in terms of elements. This is a crash course in Linear Algebra.

## **2. Algebras and coalgebras**

Using the language developed in **1**, the notions of algebras and their modules are introduced; this leads naturally to the notion of coalgebras and their comodules and their basic properties. Hereby the question arises how special properties of algebras and modules transfer to coalgebras and comodules.

## **3. Combining algebras and coalgebras**

The lecture deals with objects which allow for an algebra and a coalgebra structure subject to some compatibility conditions. Examples for this are Frobenius, Azumaya, and separable algebras.

## **4. Hopf algebras**

As a special case of the general notions from **3**, Hopf algebras are introduced by properties of related module categories.