

Abelian Categories

Definition 1. Let \mathbf{A} be a category. We say that \mathbf{A} is an *abelian category* if it satisfies the following conditions:

- (a) For any two objects $A, B \in \text{Obj}(\mathbf{A})$, the hom-set $\text{Hom}_{\mathbf{A}}(A, B)$ is an abelian group, and the composition of morphisms is bilinear.
- (b) \mathbf{A} has a zero object, i.e., an object that is both initial and terminal.
- (c) \mathbf{A} has all binary products and coproducts.
- (d) Every morphism in \mathbf{A} has a kernel and a cokernel.
- (e) Every monomorphism in \mathbf{A} is a kernel of some morphism, and every epimorphism in \mathbf{A} is a cokernel of some morphism.

Yang: To be checked.

Appendix