GROUP-LIKE ABSTRACT ALGEBRAIC STRUCTURES

ERIC BAILEY

1. Semigroupoid

- a set of objects
- for every two objects A and B, a set $\mathrm{Mor}(A, B)$ of morphisms from A to B. If f is in $\mathrm{Mor}(A, B)$, we write $f : A \to B$.
- for every three objects A, B and C a binary operation $\mathrm{Mor}(A, B) \times \mathrm{Mor}(B, C) \to \mathrm{Mor}(A, C)$ called *composition of morphisms*. The composition of $f : A \to B$ and $g : B \to C$ is written as $g \circ f$ or gf.

1.1. **Axioms.**

- associativity if $f : A \to B$, $g : B \to C$ and $h : C \to D$ then $h \circ (g \circ f) \equiv (h \circ g) \circ f$.

2. Category

A category C consits of

- a class $\mathrm{ob}(C)$ of objects
- a class $\hom(C)$ of morphisms between the objects.