

## FAMILY OPERATIONS

## Why

We want to generalize operations beyond two objects.

## Operations

The pairwise extension of a commutative operation is the function from finite families of the ground set to the ground set obtained by applying the operation pairwise to elements. TODO: this is not a function if the operation is not commutative.

The *ordered pairwise extension* of an operation is the function from finite families ground set to the ground set obtained by applying the operation pairwise to elements in order.

## Notation

Let (A, +) be an algebra and  $\{A_i\}_{i=1}^n$  a finite family of elements of A. We denote the pairwise extension by

$$\underset{i=1}{\overset{n}{+}} A_i$$

