

Sets

Arthur Ryman, `arthur.ryman@gmail.com`

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Abstract

This article contains Z Notation type declarations for concepts related to sets. It has been type checked by *fUZZ*.

1 Introduction

Typed set theory forms the mathematical foundation of Z Notation and many concepts relating to set theory are defined by its built-in mathematical tool-kit. The articles augments the tool-kit with some additional concepts.

2 Arbitrary Sets

2.1 $X \setset X$, $Y \setset Y$, and $Z \setset Z$

Let X , Y , and Z denote arbitrary sets. These will be used throughout in the statement of theorems, remarks, and examples that are parameterized by arbitrary sets.

$[X, Y, Z]$

3 Families

3.1 $\mathcal{F} \setset \text{family}$

Let X be a set. A *family* of subsets of X is a set of subsets of X . Let $\mathcal{F}X$ denote the set of all families of subsets of X .

$$\mathcal{F}X == \mathcal{P}(\mathcal{P} X)$$

4 Functions

4.1 $\text{const} \setminus \text{const}$

Let X and Y be sets and let $c \in Y$ be some given point. The mapping that sends every point of X to c is called the *constant mapping* defined by c . Let $\text{const}(c)$ denote the constant mapping.

$[X, Y]$	$\text{const} : Y \rightarrow (X \rightarrow Y)$
$\forall c : Y \bullet$	$\text{const}(c) = (\lambda x : X \bullet c)$

4.2 $|_{\text{fun}} \setminus \text{restrictU}$

Let $f : X \rightarrow Y$ and let $U \subseteq X$. Let $f|_{\text{fun}} U$ denote the restriction of f to U .

$[X, Y]$	$- _{\text{fun}} - : (X \rightarrow Y) \times \mathbb{P} X \rightarrow (X \rightarrow Y)$
$\forall f : X \rightarrow Y; U : \mathbb{P} X \bullet$	$f _{\text{fun}} U = U \triangleleft f$