Z Examples Found on the Internet

November 11, 2015

1 Introduction

1.1 Z section heading

section *gearsystem* parents *standard_toolkit*

1.2 Free types paragraph

$gearing ::= Single \mid Hub\langle\!\langle\mathbb{N}\rangle\!\rangle \mid Derailleurs\langle\!\langle\mathbb{N} \times \mathbb{N}\rangle\!\rangle$

1.3 Horizontal definition paragraph

$Wellgeared == [gears : gearing \mid gears \in \mathrm{ran}\ Derailleurs]$

1.4 Generic axiomatic description paragraph

$$
\begin{array}{l}
\boxed{\begin{array}{l}
[X, Y] \\
\hline
First : X \times Y \to X \\
Second : X \times Y \to Y \\
\hline
\forall\, x : X;\ y : Y\ \bullet \\
\quad First\ (x, y) = x\ \wedge \\
\quad Second\ (x, y) = y
\end{array}}
\end{array}
$$

1.5 Schema definition paragraph

$$
\begin{array}{l}
\underline{Gear} \\
\hline
Wellgeared \\
ingear : \mathbb{N} \times \mathbb{N} \\
\hline
\exists\, r, s : \mathbb{N} \mid gears = Derailleurs(r, s)\ \bullet \\
\quad First\ ingear < r \wedge Second\ ingear < s
\end{array}
$$

1.6 Generic schema definition paragraph

$$\begin{array}{|l}\hline \mathit{Bicycle}\,[G] \\\hline \mathit{gears} : \mathbb{P}\,G \\\hline\end{array}$$

1.7 Axiomatic description paragraph

$$\begin{array}{|l}\mathit{numgears} : \mathit{gearing} \rightarrow \mathbb{N} \\\hline \forall\,g : \mathit{gearing} \bullet \\\quad (g = \mathit{Single} \Rightarrow \mathit{numgears}\ g = 1)\ \wedge \\\quad (\exists\,x : \mathbb{N} \bullet g = \mathit{Hub}\ x \Rightarrow \mathit{numgears}\ g = x)\ \wedge \\\quad (\exists\,r, s : \mathbb{N} \bullet g = \mathit{Derailleurs}\ (r, s) \Rightarrow \mathit{numgears}\ g = r * s) \\\end{array}$$

1.8 Conjecture paragraph

Lemma1 ==

$\vdash?\ \mathit{numgears}(\mathit{Derailleurs}(3, 7)) = 21$