Z Examples Found on the Internet

June 29, 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

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

1.4 Generic axiomatic description paragraph

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

1.5 Schema definition paragraph

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

1.6 Generic schema definition paragraph

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

1.7 Axiomatic description paragraph

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

1.8 Conjecture paragraph

Lemma1 ==

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