Reversible Hypercoercions

Kuang-Chen   Andre

November 7, 2019

1   Syntax

Reversible hypercoercions are not equivalent to hypercoercions as a consequence of moving failure to the middles. Consider

$$\epsilon \overset{c_1 \to c_2}{\curvearrowright} \natural^l \ \mathbin{;} \ \natural^{l'} \overset{l_1 \perp l_2}{\curvearrowright} \epsilon = \epsilon \overset{\bullet \perp l_2}{\curvearrowright} \epsilon$$

What should go into the • depends on whether we want to blame the projection $\natural^{l'}$. The projection is guilty if the left pretype of teh second middle is not shallowly consistent with functions, but we have not information for making this decision. Here are some potential solutions:

- include a type constructor in head

- include two type constructors in bottoms.

Types	S, T	$::=$	$\star \mid P$
Pretypes	Q, P	$::=$	$\texttt{Unit} \mid T \to T \mid T \times T \mid T + T \mid \texttt{Ref } T$
Reversible Hypercoercions	c	$::=$	$\texttt{id}\star \mid h \overset{m}{\curvearrowright} t$
Middles	m	$::=$	$\texttt{Unit} \mid c \to c \mid c \times c \mid c + c \mid \texttt{Ref } c \mid {}^l\perp^l$
Heads or tails	h, t	$::=$	$\epsilon \mid \natural^l$

Figure 1: Reversible Hypercoercions