

Program Embeddings

1 Introduction

Introduction text

Language Model

Here we describe a simplistic programming language model commonly seen in the programming language community. This model is sometimes called IMP, for **IMP**erative.

IMP

$$\begin{array}{ll} \oplus & := f \in \{+, *\} \\ a & := n \in \mathbb{R} \mid x \in \text{Var} \mid \oplus(a_1, \dots, a_n) \\ b & := \top \mid \perp \mid b_1 \wedge b_2 \mid \neg b \\ c & := \text{skip} \\ & \mid x \leftarrow a \\ & \mid \text{if } b \text{ then } c_t \text{ else } c_f \\ & \mid \text{while } b \{c\} \\ & \mid c_1; c_2 \end{array}$$

Figure 1: IMP grammar

The semantics are as follows:

2 Restriction 1

We now consider the following restriction of IMP:

$$\frac{\Gamma[x] = n}{(x, \Gamma) \hookrightarrow n}$$

$$\frac{\forall i : (a_i, \Gamma) \hookrightarrow n_i}{(\bigoplus (a_1, \dots, a_n), \Gamma) \hookrightarrow \bigoplus (n_1, \dots, n_n)}$$

$$\frac{r \in \mathbb{R}}{(\bigoplus (n_1, \dots, n_n), \Gamma) \hookrightarrow r}$$

Figure 2: IMP arithmetics

Figure 3: Restriction 1 IMP grammar