Report on the outcomes of a Short-Term Scientific Mission[1]

Action number:

Grantee name:

Details of the STSM

Title: Initial semantics for polymorphic type systems

Start and end date: 04/02/2024 to 10/02/2024

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

Together with Ambroise Lafont (official host) and Thomas Lamiaux (inofficial co-host), we first reformulated work by Hamana and Fiore & Hamana into a different setting. Through this reformulation, the monoidal structure of the base category becomes simpler, making it amenable to the techniques developed first by Hirschowitz & Maggesi, and later also in collaboration with Ahrens, Lafont, and Tom Hirschowitz. Furthermore, this reformulation exhibits clearly the fibrational structure of languages over signatures over types – this fibrational structure is used for the transfer of typed signatures and their models along morphisms of types.

We then studied multiple examples of languages and expressed their syntax abstractly using our notion of signature. This confirmed that we can cover the relevant examples in our framework, with a reasonable effort.

We also wrote and submitted a talk proposal for the WG6 meeting in Leuven in April.

Makoto Hamana: Polymorphic Abstract Syntax via Grothendieck Construction. FoSSaCS 2011: 381-

---

395

Marcelo P. Fiore, *Makoto Hamana: Multiversal Polymorphic Algebraic Theories: Syntax, Semantics, Translations, and Equational Logic.* *LICS 2013*: 520-529

Description of the STSM main achievements and planned follow-up activities

The STSM achieved its goal of kickstarting a collaboration on polymorphic type systems between Ahrens, Lafont, and Lamiaux.

We have many notes from the meeting, which now need to be turned into talks and a draft paper.

We submitted a talk proposal to the WG6 meeting of EPN, to happen in April. The talk proposal has been accepted by the scientific organizers of the meeting.

As the next step, we plan to write a draft paper, and post it onto the arXiv. This collaboration will mostly happen online.

We plan to submit the paper to a conference with a submission deadline in autumn 2024. The paper will contribute to the creation of a theory of type theories, one of the deliverables of the action.

(max. 500 words)

Grantee enters max 500 word summary here.