

- JOSÉ ESPÍRITO SANTO, GILDA FERREIRA, *An embedding of IPC into  $\mathbf{F}_{\text{at}}$  not relying on instantiation overflow.*

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Since 2006 [2], it is known that intuitionistic propositional calculus **IPC** can be embedded into system  $\mathbf{F}_{\text{at}}$  – a restriction of Girard’s polymorphic system **F** to atomic universal instantiations. Such embedding relies on the Russell-Prawitz’s [4] translation of the connectives bottom and disjunction,  $\perp := \forall X.X$  and  $A \vee B := \forall X.((A \rightarrow X) \wedge (B \rightarrow X)) \rightarrow X$ , and on the phenomenon of *instantiation overflow* [3] - the possibility of deriving in  $\mathbf{F}_{\text{at}}$  the instantiation of these two universal formulas by any (not necessarily atomic) formula. In the present talk we show that there is an alternative (refined) embedding of **IPC** into  $\mathbf{F}_{\text{at}}$ , still based on the Russell-Prawitz’s translation of connectives, but based on the admissibility of disjunction and absurdity elimination rules, rather than instantiation overflow. Such alternative embedding works as well as the original embedding at the levels of provability and preservation of proof reduction (both embeddings preserve  $\beta\eta$ -conversions and map commuting conversions to  $\beta$ -equality) but the alternative embedding is more economical than the original one in terms of the size of the  $\mathbf{F}_{\text{at}}$  proofs and the length of  $\mathbf{F}_{\text{at}}$  simulations.

Details of this work can be found on [1].

[1] J. ESPÍRITO SANTO AND G. FERREIRA, *A refined interpretation of intuitionistic logic by means of atomic polymorphism*, *Studia Logica*, First Online 2019. <https://doi.org/10.1007/s11225-019-09858-1>.

[2] F. FERREIRA, *Comments on predicative logic*, *Journal of Philosophical Logic*, vol. 35 (2006), pp. 1–8.

[3] F. FERREIRA AND G. FERREIRA, *Atomic polymorphism*, *The Journal of Symbolic Logic*, vol. 78 (2013), no. 1, pp. 260–274.

[4] D. Prawitz. *Natural Deduction. A Proof-Theoretical Study*, Almqvist and Wiksell, Stockholm, 1965.