

A Logically Fully Abstract Concrete Interpretation of PCF^+

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Project description:

By giving interpretations of both a programming language \mathbf{L} and a logic \mathbf{J} in some common mathematical structure \mathcal{M} , we may be able to show that if certain theorems are provable in the logic then certain properties of programs hold. It might be useful to give an interpretation of \mathbf{J} in terms of solely the language \mathbf{L} , without reference to the structure \mathcal{M} . The question arises about whether these two interpretations describe the same thing: whether a model of one will be a model of the other. Interpretations of this type are called logically fully abstract.

Examples of logically fully abstract interpretations for sequential PCF (an extension of λ -calculus) are given by the recursive versions of categories of games. Examples of logically fully abstract interpretations of PCF^{++} are given by the category of effective Scott domains. Currently, though it has been shown that a logically fully abstract interpretation for PCF^+ exists, no concrete example has been given.

For my thesis, I propose to work at presenting a logically fully abstract tangible model of PCF^+ . I have taken mathematical logic, which will hopefully give me a good background for this material. To undertake such a task, I will read about denotational semantics and interpretations of PCF .