The Lambda Calculus and Denotational Semantics

Matthias Felleisen

Programming Languages and Models
@article{ds:datatypes-as-lattices,
  author = "Dana S. Scott",
  title = "Data types as lattices",
  journal = "SIAM Journal of Computing",
  volume = 5,
  issue = 3,
  year = 1976,
  pages = "522--587"
}

Content Scott summarizes in this journal paper how to assign the lambda calculus and semantics in the power set of the natural numbers interpreted as lattices. Then he generalizes the idea and shows how to use the retractions to explain all possible data types and thus how to assign meaning to languages with such data types.

Note: Results from these publications were widely known in those days long before the papers appeared. The dates on these papers are thus somewhat misleading and don’t explain the idea migration.

LCF Models and Programming Languages
@article{gdp:lcf-as-pl,
  author = "Gordon D."Plotkin",
  title = "{LCF} Considered as a Programming Language",
  journal = "Theoretical Computer Science",
  year = 1977,
  pages = "223--255"
}
Plotkin investigates what kind of fundamental questions concerning equality (and approximation) we can ask about programming languages once we have a denotational model and direct connection between the terms and the denotations. “Junk” in denotational spaces causes the equality relationship on denotations to differ from observational equivalence, formulating the question of full abstraction (for both finite and infinite elements).