HAUSDORFF RESEARCH INSTITUTE
FOR MATHEMATICS

UNIVERSITÄT BONN

Workshop

"Bridging between informal and formal "

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organized by

Kevin Buzzard, Jacques Carette, Valeria de Paiva, Michael Kohlhase, Josef Urban

Abstracts

Aarne Ranta (Chalmers and University of Gothenburg)

Informath: Informalization of Formal Mathematics

Abstract: Formal mathematics, implemented in systems such as Lean, Coq, and Agda, comprises an increasing amount of mathematical knowledge. The project Informath aims to establish mappings between formal mathematics and ordinary mathematical language. This would make the results of formal mathematics more available both to mathematicians and to a wider audience. It would also help AI systems to construct formal proofs by making informal mathematics available as training material. The core of Informath is multilingual grammars defined in GF, Grammatical Framework. Numerous earlier projects have shown the potential of GF in mapping between formal and informal languages. Building on their results and experiences, and developing some new methods, Informath aims to extend the coverage to a new level. The first concrete goal is to cover an undergraduate mathematics curriculum as defined in the MathGloss project of de Paiva and Horowitz, and convert its definitions and theorems, as formalized in Lean, to Wikipedia articles in ten human languages.

Carlos Zapata-Carratalá (Wolfram Institute)

Hypergraph Rewriting as a Foundation for Diagrammatic Calculus

Abstract: Diagrammatic and graphical reasoning has proven exceptionally powerful for the development and pedagogy of Category Theory. I will show that similar diagrammatic approaches recover all manner of algebraic structures; ranging from familiar ones such as monoid actions to exotic higher-arity ones such as semiheaps or Bhattacharya-Mesner algebras. I will present a computational foundation for diagrammatic calculus based on hypergraph rewriting together with an implementation as a Mathematica paclet available in beta for anyone to try.