Philipps Universität Marburg

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

Gemeinsames Mathematisches Kolloquium der Universitäten Marburg und Gießen

Am Mittwoch, dem 22. Mai 2024 spricht

Prof. Dr. Michael Kohlhase

vom Department Informatik der FAU Erlangen-Nürnberg in Marburg über

Prospects of Formalized Mathematics

16.30 Uhr Tee und Kaffee im Seminarraum VII (Ebene 5, Raum 05 D 01)

17.00 Uhr Vortrag im Hörsaal IV (Ebene 4, Raum 04 A 30)

Im Anschluss ist eine Nachsitzung geplant (bitte bei Frau Treder anmelden)

Abstract. In (informal) mathematics, a human studies rigorously represented objects or mathematical models of the real world, comes up with conjectures about their properties, proves or refutes them, submits them for review and finally publication in the academic literature. While it is commonly accepted that all of mathematics could be expressed and indeed developed in first-order logic based on (some axiomatic) set theory, this option is almost never executed in practice.
Formalized mathematics aims to enable computer support of "doing mathematics" by representing objects, conjectures, proofs, and even publications in formal systems, usually expressive logical languages with machine-checkable proof calculi, and highly efficient algorithms for automating various aspects of "doing mathematics". Highlights of formalized mathematics are

- machine-checked proofs of major theorems like the Kepler Conjecture, Feit/Thomson's „odd order theorem", or the four color theorem,
- search engines for mathematical formulae,
- synthesis and verification of computer algebra algorithms,
- multiple libraries of formalized and verified mathematics with more than 100.000 theorems/proofs.

This talk will give an overview over the issues and results and introduces some of the techniques.