250116-1 VO Computational Group Theory (2024S)

ECTS: 3.00 SWS: 2.00

Algorithms and techniques for computations in infinite, finitely presented groups.

Topics include:

* Stallings' folding and related free group algorithms

* Reidemeister-Schreier Algorithm for computing a presentation of a subgroup.

* Todd-Coxeter coset enumeration

* Rewriting systems and the Knuth-Bendix Algorithm

* Finite state automata and Automatic Groups

We will also introduce free software tools to do the above computations, including GAP, SAGE, KBMAG.

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Meetings: M 16:45-18:15 in HS13, OMP1, Stock 02.

Text: The course will not follow a fixed text, but will be inspired by:

D. B. A. Epstein, D. F. Holt, and S. E. Rees, The use of Knuth-Bendix methods to solve the word problem in automatic groups, J. Symbolic Comput. 12 (1991), no. 4-5, 397–414.

David B. A. Epstein and Derek F. Holt, Computation in word-hyperbolic groups, Internat. J. Algebra Comput. 11 (2001), no. 4, 467–487.

Derek F. Holt, Bettina Eick, and Eamonn A. O'Brien, Handbook of computational group theory, Chapman & Hall/CRC, Boca Raton, FL, 2005.

Ilya Kapovich and Alexei Myasnikov, Stallings foldings and subgroups of free groups, J. Algebra 248 (2002), no. 2, 608–668.

Exam: The exam will be oral, covering the contents of the lecture.

Disclaimer: Information in this syllabus is subject to change. Changes will be announced via Moodle.