

Topics in Automated Theorem Proving (236 714): SS 2018

Last given: By J.A. Makowsky (2015, 2013/14, 2006/7, 2003, 1989/90), by Monty Newborn (1992/93)

Homepage 2018:

<http://cs.technion.ac.il/~janos/COURSES/THPR-2018/index.html>

Old Homepages: [2013/14](#) and [2015](#)

Lecturer: Prof. J.A. Makowsky

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Office hours: Thursdays after the Targul, and by appointment via e-mail.

Format of the course: 2 hours lecture + 1 hour targul

Lecture: Thursday 9:30-11:30 (Starting March 22)

Targul: Thursday 11:30-12:30 (starting March 29)

Place: TBA

Course details:

Course outline: Automated theorem proving is used in various rather different ways.

- Universal formalisms are used in Artificial Intelligence and Databases to automatize deductive systems in general data and knowledge processing.
- Various SAT-solvers are used for computer-aided verification of various systems.
- Highly specialized formalisms are used in well structured applications such as computational geometry and other branches of computer aided mathematics.
- Proof assistants are used to verify complex systems including complex mathematical proofs such as the 4-color theorem or the proof of Kepler's conjecture.

We shall study these approaches in a certain depth.

Course goal:

Exploring the achievements of automated theorem proving.

Introducing topics for M.Sc. and Ph.D. theses.

Prerequisites: Logic for CS (234 293)

Course requirements:

Four homework assignments or Projects or take home exam.

Literature:

- J. Harrison, **Handbook of Practical Logic and Automated Reasoning**, Cambridge University Press, 2009
 - A. Robinson and A. Voronkov, eds
Handbook of Automated Reasoning, vol. 1 and 2
The MIT Press and North Holland, 2001
 - B.F. Caviness and J.R. Johnson (eds), **Quantifier Elimination and Cylindrical Algebraic Decomposition**, Springer 1998
 - Recent papers of interest, to be posted when relevant.
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[Participants 2018](#)

