UPPSALA UNIVERSITET
Matematiska institutionen
Erik Palmgren

Läsanvisning
Tillämpad logik DV1
2004-05-14

Syllabus

1. Undecidability of predicate logic, Huth and Ryan (2002), Section 2.5.
2. Equational logic, Birkhoff's completeness theorem, the Martelli-Montanari unification algorithm, Palmgren (2004a).
3. Constructive logic and type theory, Palmgren (2004b), Chapter 1 – 10.
4. The completeness and soundness theorem for propositional and predicate logic using analytical tableaux, Smullyan (1995), Chapter II, IV and V.
5. Skolem normal form, Skolemization, refutation methods and resolution, Palmgren (2002).
6. Model-checking and CTL, Huth and Ryan (2002), Sections 3.1 – 3.5.
7. Binary decision diagrams, Huth and Ryan (2002), Sections 6.1 – 6.2.

Course literature

M R A Huth and M F Ryan. *Logic in Computer Science: Modelling and reasoning about systems.* Cambridge University Press 2002.

E. Palmgren (2002), *Some logical background to the resolution method.* Lecture notes. Matematiska institutionen, Uppsala universitet. 7 pages.

E. Palmgren (2004a), *Equational logic.* Lecture notes. Matematiska institutionen, Uppsala universitet. 12 pages.

E. Palmgren (2004b), *Constructive logic and type theory.* Lecture notes. Matematiska institutionen, Uppsala universitet. 54 pages.

R M Smullyan. *First-Order Logic.* Dover Publishing 1995.

Reference literature

E. Palmgren (2001), *Oavgörbara problem i elementär aritmetik.* Föreläsningsanteckningar. Matematiska institutionen, Uppsala universitet.

D. van Dalen (1994) *Logic and Structure.* Third edition. Springer.

Typical exam problems

Exam problems from previous years (see web page):

2000-10-20: 1, 2, 3.(a), 5, 8.

2001-10-17: 1, 2, 3, 4, 5.

2002-10-08: 1, 2, 3, 5, 6.

2002-10-17: 1, 2, 3, 5, 7, 8.

Problems from Palmgren 2004a: 1.1.1 – 3.
Problems from Huth and Ryan 2002: 3.3.3 – 6, 3.4.1 – 3, 3.7.4.
Hand-in problems from Exercise sheets 1 – 4.
Random theoretical questions: These may be statements and explanations of theorems, methods and definitions covered in the course.

As always, there may also be non-typical problems ...

Notes and literature allowed during the exam

- One page (A4) of your own handwritten notes.
- Smullyan (1995): First-Order Logic.
- Palmgren (2002): Logical background to the resolution method.

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