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New Foundations for Separation Logic

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Stellingen

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New Foundations for Separation Logic

1. An alias analysis separates 'separation logic' from 'Reynolds' logic'. (Chapter 1)
2. There is no sound and complete finitary proof system for standard separation logic, nor for full separation logic, nor for the fragment of separation logic light. (Chapter 2)
3. A sound and complete finitary proof system exists for the first-order definable heap interpretation of separation logic, and also for extended separation logic comprising structures satisfying a semantic comprehension condition. (Chapter 3)
4. Reynolds' logic is also sound and relatively complete in a general semantics with infinite heaps, and via dynamic separation logic one obtains alternative axiomatizations of Reynolds' logic that satisfy gracefulness. (Chapter 4)
5. Second-order arithmetic is sufficient for computer science.
6. Separation logic lies between first-order and second-order logic, but it is an open problem whether full separation logic and second-order logic are equally expressive.
7. Diagonalization and self-reference are essential in undecidability.
8. Not only programs could contain bugs, but also specifications.
9. Some propositions are trivial since they follow from the definitions.
10. As a scientist, one enjoys being right—but also becoming wrong.

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