Stellingen

behorende bij het proefschrift

Enhanced Coinduction van Jurriaan Rot

1. Enhancements of the coinductive proof method can be developed very generally at the level of coalgebras, and consequently can be used to simplify reasoning about a wide range of different systems and their (potentially infinite) behaviour (Chapters 4,5).

2. The theory of coalgebras provides a new perspective on systems that have been long known and studied extensively. For instance, by instantiating the abstract proof techniques developed in this thesis to deterministic automata, one obtains a useful method for reasoning about operations on languages (Chapter 2).

3. The interaction between algebra and coalgebra is captured elegantly by the categorical concepts of bialgebras and distributive laws, providing a solid foundation to extend both the effectiveness and the expressiveness of coinductive techniques (all chapters).

4. Coinductive predicates can be defined systematically and uniformly in terms of a lifting of a functor (that models the class of systems of interest) to a category of predicates. From this lifted functor, one canonically derives enhanced proof techniques for the associated coinductive predicate (Chapter 5).

5. Many software bugs could be avoided just by being aware of method contracts and invariants during programming. This requires some familiarity with formal methods, but no advanced theory or tools.

6. In computer science, there should always be room to pursue research that does not necessarily concern fashionable technological novelties, but is motivated in the first place by the aim to broaden our understanding of computation.

7. Scientific conferences are the wrong place to discuss the application of formal methods in industry. Such applications can only be successful if carried out (mainly) by industry itself, since academics have no incentives and resources to focus on usability of their tools.

8. There are never enough formalisms to model a coffee machine.

9. The use of useless activities is that they confront us with our belief that everything should have a use.