Asynchronous Programming in the Abstract Behavioural Specification Language

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Propositions belonging to the PhD dissertation Asynchronous Programming in the Abstract Behavioural Specification Language

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1. Current programming means of parallelism and communication are insufficient for optimally exploiting the computational power of multicore architectures (Chapter 1).

2. It is generally recognized that asynchronous communication is well suited for distributed applications and therefore the actor model is a natural fit for such systems (Chapter 5).

3. The resulting integration of Actors with object-orientation allows for new object-oriented models of concurrency that are better suited for the analysis and construction of distributed systems than the standard model of *multi-threading* (Chapter 1, 4 and 5).

4. ABS can bridge modelling and programming for the purpose of formal reasoning and verification (this thesis).

5. Data streaming is gaining ever-growing applications in different domains. Integration of data streams with ABS enables formal reasoning and verification of data streaming in a concurrent object system (Chapter 4).

6. Absence of particular deadlocks caused by coroutines in an actor-based model of concurrency that features Cooperative Scheduling is decidable, even in the context of unbounded method invocations (Chapter 6).

7. The current challenge in language design is to efficiently use the underlying multicore resources while maintaining a high level of abstraction for the programmer.

8. Only the most capable programmers can explicitly control concurrency, and efficiently make use of the relatively small number of cores readily available today.