Timed Process Algebra: Theory and Applications

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This is joint work with Jan Bergstra, University of Amsterdam and Utrecht University.

We give an overview of our work since 1989 on process algebra extended with timing constructs. Based on untimed process algebra, we have extensions with discrete timing (time divided into slices) and dense timing (continuous time). We have variants with relative timing, absolute timing and parametric timing (where relative and absolute are integrated). We have variants with timestamped actions and with two-phase timing (where execution of actions and passage of time are separated). We stress the fact that all these styles are needed, and should interact closely. We have an integrated framework, based on conservative extensions. All timing constructs found in the literature can be translated into this framework.

We mention a number of applications. More information can be found on http://www.win.tue.nl/win/cs/fm/josb.

A Unified Relational Approach to Semantics of Non-deterministic Applicative Programs

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The natural meaning of a program written in an applicative language like LISP or ML is a (possibly partial) function. Functions are specific relations, and the idea of relational semantics for applicative programs is to regard the semantics of programs as elements of an (abstract) relational algebra.

In general, relations are neither univalent nor total. Thus, using them rather than functions in semantics, one is able to avoid the complexity introduced by artificial bottom elements denoting undefinedness and has, in addition, natural candidates for modelling