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14h00
UT3 Paul Sabatier, IRIT, Auditorium J. Herbrand

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From MTL to deterministic timed automata

Abstract: We propose a novel technique for constructing timed automata from properties expressed in the logic MTL, under bounded-variability assumptions. We handle full MTL and include all future operators. Our construction is based on separation of the continuous time monitoring of the input sequence and discrete predictions regarding the future. The separation of the continuous from the discrete allows us to determinize our automata in an exponential construction that does not increase the number of clocks. This leads to a doubly exponential construction from MTL to deterministic timed automata, compared with triply exponential using existing approaches.

We offer an alternative to the existing approach to linear real-time model checking. It further offers a unified framework for model checking, runtime monitoring, and synthesis, in an approach that can reuse tools, implementations, and insights from the discrete setting.