A Temporal Logic of Intervals and Its Tableau-based Decision Procedure

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Abstract

We propose an interval temporal logic which can express punctuality timing constraints and has a reasonable complexity. The logic allows most specifications that are interesting in practice, and retains punctuality. It incorporates both event and state types, as both views are important for system development. We use intervals as primitive objects to model time and incorporate the notion of duration, denoting the length of a state (or an event), and accumulation, denoting the total duration of a state. We also propose a tableau based decision procedure and prove that our logic has the finite model property. We show that the satisfiability problem is decidable, and the complexity of the satisfiability problem is NEXPTIME. The logic can specify many real-time system properties which were previously specified by undecidable logics.

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