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Branching time logics $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$ with operations *Until* and *Since* based on bundles of integer numbers, logical consecutions, deciding algorithms. (English) Zbl 1148.03011
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Summary: This paper is intended as an attempt to describe logical consequence in branching time logics. We study temporal branching time logics $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$ which use the standard operations *Until* and *Next* and dual operations *Since* and *Previous* (LTL, as standard, uses only *Until* and *Next*). Temporal logics $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$ are generated by semantics based on Kripke/Hintikka structures with linear frames of integer numbers \mathcal{Z} with a single node (glued zeros). For $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$, the permissible branching of the node is limited by α (where $1 \leq \alpha \leq \omega$). We prove that any logic $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$ is decidable w.r.t. admissible consecutions (inference rules), i.e. we find an algorithm recognizing consecutions admissible in $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$. As a consequence, it implies that $\mathcal{BTL}_{N,N-1}^{U,S}(\mathcal{Z})_\alpha$ itself is decidable and solves the satisfiability problem.

MSC:

[03B44](#) Temporal logic
[03B25](#) Decidability of theories and sets of sentences
[03B70](#) Logic in computer science

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[Decidability](#); [Algorithms](#); [Logical consecutions](#); [Inference rules](#); [Temporal logic](#); [Linear temporal logic](#); [Branching time logic](#); [Admissible consecutions](#)

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