

情報電子工学科 学会発表

学会名	科学基礎論学会2016年度研究例会ワークショップ
演題名	Paraconsistent sequential linear-time temporal logic and its application to medical reasoning
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内容	<p>Inconsistency-tolerant temporal reasoning with sequential (i.e., ordered or hierarchical) information is gaining increasing importance in computer science applications such as medical informatics and agent communication. A logical system for representing such reasoning is thus required for obtaining a concrete theoretical basis for such applications. However, to the best of our knowledge, there are no logical systems that can simultaneously represent inconsistency, sequentiality, and temporality. Thus, the aim of our study is to introduce a logical system, both semantically and syntactically, for appropriately representing inconsistency-tolerant temporal reasoning with sequential information.</p> <p>Hence, we introduce a new logic called paraconsistent sequential linear-time temporal logic (PSLTL), which is an extension of the standard linear-time temporal logic (LTL). Inconsistency-tolerant reasoning in PSLTL is expressed via a paraconsistent negation connective, and sequential information is represented by sequence modal operators. Temporal reasoning in PSLTL is, of course, expressed by temporal operators used in LTL. We show that a Kripke-style semantics for PSLTL is useful for appropriately handling medical reasoning in a new model checking framework called paraconsistent model checking. We also prove some fundamental theorems for PSLTL, such as completeness and cut-elimination theorems, which are obtained via theorems for semantically and syntactically embedding PSLTL into its fragments.</p>