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Conflict vs causality in event structures. (English) [Zbl 07316064]

Summary: Event structures are one of the best known models for concurrency. Many variants of the basic model and many possible notions of equivalence for them have been devised in the literature. In this paper, we study how the spectrum of equivalences for Labeled Prime Event Structures built by Van Glabbeek and Goltz changes if we consider two simplified notions of event structures: the first one is obtained by removing the causality relation (Coherence Spaces) and the second one by removing the conflict relation (Elementary Event Structures). As expected, in both cases the spectrum turns out to be simplified, since some notions of equivalence coincide in the simplified settings; actually, we prove that removing causality simplifies the spectrum considerably more than removing conflict. Furthermore, we also prove that the labeling of events and a property that we call finitariness strongly influence the spectrum of equivalences in the conflict-free setting, whereas they have no impact on the causality-free spectrum.

MSC:
68Q85 Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)
68Q55 Semantics in the theory of computing

Keywords:
event structures; behavioral equivalences; semantics of true concurrency

Software:
nauty; Traces

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References: