Hoogers, P. W.; **Kleijn, H. C. M.**; **Thiagarajan, P. S.**
An event structure semantics for general Petri nets. (English) [Zbl 0872.68126]
Theor. Comput. Sci. 153, No. 1-2, 129-170 (1996).

Summary: We address the following question: What type of event structures are suitable for representing the behaviour of general Petri nets? As a partial answer to this question we define a new class of event structures called local event structures and identify a subclass called UL-event structures. We propose that UL-event structures are appropriate for capturing the behaviour of general Petri nets. Our answer is a partial one in that in the proposed event structure semantics, auto-concurrency is filtered out from the behaviour of Petri nets. It turns out that this limited event structure semantics for Petri nets is nevertheless a non-trivial and conservative extension of the (prime) event structure semantics of 1-safe Petri nets provided in *M. Nielsen, G. Plotkin* and *G. Winskel* [Theor. Comput Sci. 13, 85-108 (1981; Zbl 0452.68067)]. We also show that the strong relationship between prime event structures and 1-safe Petri nets established in a categorical framework in *G. Winskel* [Lect. Notes Comput. Sci. 255, 325-392 (1987; Zbl 0626.68022)]can be extended to the present setting, provided we restrict our attention to the subclass of Petri nets whose behaviours do not exhibit any auto-concurrency. Finally, we show that Winskel's general and stable event structures can be smoothly related to local event structures and that similarly prime event structures can be related to UL-event structures.

MSC:

68Q85	Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)
68Q55	Semantics in the theory of computing
68Q45	Formal languages and automata

Cited in **12** Documents

Keywords:

event structures; Petri net; local event structures; UL-event structures; auto-concurrency

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