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Formal specification and algorithmic implementation of DEVS based on Agent

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Abstract

To overcome the weakness in directly describing intelligent behaviors, the agent-based modeling method was introduced into discrete event system specification (DEVS). Agent-DEVS, a specification with description ability of intelligence and cooperation, was proposed based on Parallel-DEVS. The state element was expanded to agent personality element and the agent model element was added to represent intelligent individual behaviors. The input and output of the model ports were extended to agent message type that represented social cooperation. In addition, an implementation algorithm of Agent-DEVS model was given and its application in production scheduling was put forward. Algorithmic analysis and simulation test results show that the main merit of Agent-DEVS lies in its modeling performances, for it can describe more complex intelligent and autonomous behaviors, while little influence on the complexity of computational time.

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Author keywords

Agent; Algorithm; DEVS(discrete event system specification); Formalization; Production scheduling

Index Keywords

Agent model; Agent-based modeling; Algorithmic analysis; Autonomous behaviors; Computational time; DEVS models; Discrete event system specification; Formal Specification; Formalization; Implementation algorithms; Input and outputs; Intelligent behavior; Intelligent individuals; Modeling performance; Production scheduling
Engineering controlled terms: Parallel processing systems; Production engineering; Scheduling algorithms; Specifications
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