Event-Based Simulation of Objects and Agents

Event-Based Simulation is the most basic form of Discrete Event Simulation (DES), which is an umbrella term subsuming several paradigms and formalisms. Event-Based Simulation is characterized by event scheduling with a Future Events List. It has been pioneered by the simulation language SIMSCRIPT in the 1960s and formally defined by the *Event Graphs* of Schruben (1983). Event Graphs and Event-Based Simulation can be extended by adding the concepts of objects, activities and agents.

Structure:

1. Introduction to Event-Based Simulation
    a. Concepts: State Variables, Events and Event Types, Event Graphs, Future Events List
    b. Example Model
    c. Event-Based Simulation with NetLogo
    d. Event-Based Simulation with JavaScript
2. Introduction to Object Event Simulation
    a. Concepts: Objects and Object Types, Events and Event Types, Object Event Graphs
    b. Example Model
    c. Object Event Simulation with NetLogo
    d. Object Event Simulation with JavaScript
3. Modeling Agents as Interactive Objects
    a. Agent Concepts: Information State, Perceptions, Actions, Communication
    b. Example Model
    c. Event-Based Simulation of Agents with JavaScript
    d. Outlook: The Mental State of an Agent

Expected audience: By introducing basic concepts and (non-technical) example models, as well as simulation technologies, the tutorial addresses both non-computational and computational scientists.

Short bio: Gerd Wagner is Professor of Internet Technology at Brandenburg University of Technology, Cottbus, Germany. After studying Mathematics, Philosophy and Informatics in Heidelberg, San Francisco and Berlin, he (1) investigated the semantics of negation in knowledge representation formalisms, (2) developed concepts and techniques for agent-oriented modeling and simulation, (3) participated in the development of a foundational ontology for conceptual modeling, the Unified Foundational Ontology (UFO), and (4) created a new Discrete Event Simulation paradigm: Object Event Modeling and Simulation (OEM&S), and a new process modeling language: the Discrete Event Process Modeling Notation (DPMN). He also runs the web-based simulation portal https://sim4edu.com.

Contact information: Prof. Gerd Wagner, Department of Informatics, Brandenburg University of Technology, Konrad-Wachsmann-Allee 5, 03046 Cottbus, Germany. Email address: g.wagner@b-tu.de