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-- 2.8.2. Timed Petri nets -- 2.8.3. Flow networks -- 2.8.4. Queuing networks -- 2.9. Multi-modeling -- 2.9.1. Multi-formalism versus mono-formalism -- 2.9.2. The DEVS hierarchical model -- 2.9.3. Multi-layer networks -- 2.10. Conclusion -- PART 2: Network Analysis Methods and Applications -- 3. Exact Methods Applied to the Flow Analysis of Topological Networks -- 3.1. Introduction -- 3.2. Additive flow networks - deterministic modeling by flow networks. 3.2.1. Two-terminal series-parallel graph -- 3.2.2. General case - max-flow/min-cut -- 3.3. Additive flow networks - stochastic modeling by queuing networks -- 3.4. Synchronized flow networks - modeling by timed event graphs -- 3.4.1. Steady-state analysis of timed event graphs -- 3.4.2. Example of application: sizing a flow-shop -- 3.5. Conclusion -- 4. Simulation Techniques Applied to the Analysis of Sociological Networks -- 4.1. Introduction -- 4.2. Simulation techniques -- 4.2.1. Discrete event simulation (worldviews) -- 4.2.2. DEVS formalism -- 4.2.3. Coupling simulation/resolutive methods -- 4.2.4. Distributed simulation -- 4.2.5. Architectural solutions -- 4.2.6. Time management and synchronization -- 4.2.7. Pessimistic approach -- 4.2.8. Optimistic approach -- 4.2.9. HLA -- 4.2.10. Cosimulation -- 4.2.11. FMI/FMU -- 4.2.12. FMI/FMU and HLA coupling -- 4.3. Simulation of flows in sociological networks -- 4.3.1. Behavioral simulation based on DEVS formalism -- 4.3.2. Application study -- 4.4. Conclusion -- PART 3: Case Studies -- 5. Smart Grid -- 5.1. Summary of the study -- 5.2. Demand profile -- 5.3. Solar power station, fuel station and regional import -- 5.4. Hydroelectric power station and PHES -- 5.5. Operational issues -- 5.6. Model -- 5.6.1. Decision variables -- 5.6.2. Constraints -- 5.6.3. Objective function -- 5.7. Optimization results -- 6. Forestry Logistics -- 6.1. Summary of the study -- 6.2. Forest timber supply problem -- 6.3. Tactical planning model -- 6.4. Logistics benchmarking -- 6.4.1. AS IS scenario (non-collaborative logistics) -- 6.4.2. TO BE scenario (collaborative logistics) -- 6.4.3. Results -- 6.5. Conclusion -- 7. Multi-layered Digital Social Networks -- 7.1. Summary of the study -- 7.2. Digital social networks -- 7.3. Studying digital social networks via an interview broadcast. 7.3.1. Pre-interview social network scenario -- 7.3.2. Social network audience -- 7.4. Modeling and simulation -- 7.4.1. Modeling the interview production and broadcast processes -- 7.4.2. MSN/HLA simulation architecture -- 7.5. Simulation results -- 7.6. Conclusion and perspectives -- References -- Index -- Other titles from iSTE in Systems and Industrial Engineering - Robotics -- EULA.

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## Sommario/riassunto

As a result of its widespread implementation in economic and social structures, the network concept appears to be a paradigm of the contemporary world. The need for various services - transport, energy, consumption of manufacturing goods, provision of care, information and communication, etc. - draws users into interwoven networks which are meshes of material and immaterial flows. In this context, the user is a consumer of goods and services from industries and administrations, or they themselves are part of the organization (digital social networks). This book examines the invariants that unify networks in their diversity, as well as the specificities that differentiate them. It provides a reading grid that distinguishes a generic level where these systems find a common interpretation, and a specific level where appropriate analytical methods are used. Three case studies from different fields are presented to illustrate the purpose of the book in detail.

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