
Contents

About This Book	ix
Introduction	xv
Chapter 1. Computer Simulation of Discrete Flows	1
1.1. Introduction	1
1.2. Worked example	1
1.2.1. Map of the resort	2
1.2.2. Problem statement and design brief	3
1.3. Setting up the project in the ExtendSim 9 software	5
1.3.1. Definition of the principal parameters	5
1.3.2. Designing the model and inputting constraints	7
1.3.3. Definition of flows	22
1.3.4. Running the simulation	22
1.3.5. Creation and allocation of resources	24
1.3.6. Rerunning the simulation	28
1.3.7. Generating a report and analysis	29
1.3.8. Development, enhancement and improvement	31
1.3.9. Hierarchy	38
1.3.10. Appearance design	40
1.4. Conclusion	44
Chapter 2. Simulation of Mixed Flows	47
2.1. Mixed Flows	47
2.2. An example of modeling mixed flows	48
2.2.1. Problem statement and specifications	48
2.3. Creating and inputting the project in ExtendSim	52
2.3.1. Definition of the principal parameters	52

2.3.2. Soda production and bottling	53
2.3.3. Transport, carbonation and labeling	80
2.3.4. Packaging and storage	85
2.3.5. Maintenance and cleaning.	93
2.3.6. Finishing touches	98
2.4. Conclusion	108
Chapter 3. 3D Flows and Evacuation Simulation	109
3.1. 3D flows	109
3.2. The Pathfinder software	110
3.3. Evacuation of a building with PathFinder	111
3.3.1. Importing and formatting the first floor plans	113
3.3.2. Creating the different first floor rooms	117
3.3.3. Creating the first floor doors	120
3.3.4. Populating with occupants	122
3.3.5. Simulation and results for the first floor evacuation	123
3.3.6. Incorporating furniture.	126
3.3.7. Importing and formatting the second floor plans	128
3.3.8. Creating rooms, doors and populating with occupants	129
3.3.9. Creating the stairs.	130
3.3.10. Simulation and results for evacuation of the whole building.	134
3.4. Extensions	146
3.4.1. Moving to SFPE mode.	146
3.4.2. Groups of occupants	148
3.4.3. Managing the elevators	148
3.4.4. Creating viewpoints	154
3.4.5. Creating camera tours	156
3.4.6. Further possibilities.	158
Chapter 4. 3D Flows, Distribution and Warehousing	159
4.1. Product distribution	159
4.2. The FlexSim software.	159
4.3. Basic concepts of the FlexSim software	160
4.3.1. General appearance of FlexSim	160
4.3.2. Libraries	162
4.3.3. Mouse-based functions	164
4.3.4. Connections between objects	165
4.4. Worked example.	166
4.4.1. Description of the warehouse.	167
4.4.2. Warehouse operation.	168
4.4.3. Modeling stage 1	170
4.4.4. Modeling stage 2	178

4.4.5. Modeling stage 3	184
4.5. Detailed flow and task executor management.	194
4.5.1. Generation of containers with several types of content.	194
4.5.2. A fixed resource for task executors	198
4.5.3. Shared task executors	200
4.5.4. Pulled and pushed flows and more.	204
4.5.5. Naming items	210
4.5.6. Timetables, groups and resources	216
4.6. Experimenter	231
4.6.1. Constructing the model	231
4.6.2. Adding the dashboard	232
4.6.3. Configuring the Experimenter	235
4.7. Concluding remarks	239
Conclusion	241
Glossary	245
Bibliography	251
Index	259