Distributed Event-driven Simulation- Scheduling Strategies and Resource Management
Overeinder, B.J.

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Index

absolute efficiency, 126
ACA, see asynchronous cellular automata
activity, 3
activity scanning, 9
adaptive optimism control
  global state, 40
  local state, 39
aggressive cancellation, 32
anti-message, 31
APSE, 84–91, 119
APSIS, 49, 55–65, 114, 138
asynchronous cellular automata, 105, 106
  nondeterministic, 106
attribute, 3
average parallelism, 77, 79, 91, 119
Beowulf parallel computer, 156
Boltzmann distribution, 112
CA, see cellular automata
cancel queue, 66, 68
cancellation strategies, 32
  aggressive, 32
  direct, 33
  lazy, 32
  lazy re-evaluation, 33
cascaded rollbacks, 37, 130, 141
causality
  (local) constraint, 23, 61
  error, 22
cellular automata, 104
  asynchronous, 105, 106
  nondeterministic, 106
  parallel asynchronous, 108
  parallel synchronous, 107
  synchronous, 104
checkpointing, 168
cluster computing, 156
clusters of workstations, 156
computational critical behavior, 137, 150
computer experiment, 1
computer simulation, 1
conservative methods, 20, 24–28
continuous system, 3
continuous-time model, 6
copy state saving, 34, 68
correlations, 133, 137
  long-range, 137, 139, 142
COW, see clusters of workstations
critical exponent, 133
critical path, 78
  analysis, 83
  enumeration algorithm, 89
critical sections, 168
critical system, 135
critical time, 83, 88
DAS parallel computer, 92, 118, 138, 156
data dependency graph, 78
DCS, see dynamic complex systems
deadlock avoidance, 25
deadlock detection and recovery, 26
direct cancellation, 33
discrete event model, 7
discrete event simulation
  activity scanning, 9
  event scheduling, 8, 56
  parallel, 24, 28
  process interaction, 9, 56, 81
  self-initiating, 45
  world view, 8
discrete system, 3
discrete-time model, 7
DISS, 98
distributed computing, 11, 155
distributed memory, 10, 156
DPVM, see Dynamite
dynamic complex system, 103
dynamic load balancing, see load balancing
Dynamic PVM, see Dynamite
Dynamite, 162–165
entity, 3
event, 3
  endogenous, 3
  exogenous, 3
  external, 21
  internal, 21
  scheduling, 8
event granularity, 127
event message, 21
event precedence graph, 80
event queue, see input queue
event retraction, 66, 71
event-driven simulation, 8
experimental framework, 3
Fornax, 52
fossil collection, 31, 41, 72
fractal properties, 133
global virtual time, 31, 41, 61, 73
  centralized computation, 41
  distributed computation, 43
grid computing, 154
GVT, see global virtual time
High Level Architecture, 13
high performance computing, 12, 158
high throughput computing, 12, 158
HLA, see High Level Architecture
incremental state saving, 35, 67
inherent parallelism, 77, 119
input queue, 63, 68
Ising spin model, 109, 135
  continuous-time, 113, 114
  critical temperature, 113
  ferromagnetic, 110
  paramagnetic, 110
Ising spin phase transition, 137, 138
job, 11
lazy cancellation, 32
lazy re-evaluation, 33
load balancing, 12
  dynamic, 12, 162
  local-area, 166
  migration decider, 167
  optimistic simulation, 39, 190
  resource monitoring, 167
  scheduler, 166
  wide-area, 161
local virtual time, 30, 61
local-area networks, 156
logical clocks, 30
logical processes, 21
long-range correlations, 137, 139, 142
lookahead, 27
LVT, see local virtual time
massively parallel processor, 10, 156
metacomputing environment, 154
Metropolis algorithm, 112
model, 4
  continuous, 5
  deterministic, 5
  discrete, 5
  dynamic, 5
  state, 3, 21
  static, 5
  stochastic, 5
Monte Carlo method, 103, 112, 126
Monte Carlo time step, 119
MPP, see massive parallel processor
networks of workstations, 156
non-adaptive optimism control, 38
NOW, see networks of workstations
null message, 25
optimism control, 37, 62, 70, 124, 147
  adaptive global state, 40
  adaptive local state, 39
  non-adaptive, 38
optimism throttling, see optimism control, 124
optimistic methods, 20, 28–44
output queue, 63, 68
parallel discrete event simulation, 20
  conservative, 24
  optimistic, 28
parallel efficiency
  absolute, 126
  relative, 118
parallel random number generation, 115
  leap-frog, 116
  splitting, 116
parallelism profile, 79, 90
periodic checkpointing, see periodic state saving
periodic state saving, 34
PERT algorithm, 87, 88
physical critical behavior, 137, 150
physical processes, 21
Polder metacomputer, 159–162
positive message, 31
potential parallelism, 77
power-law distribution, 133
predictability, 26
priority queue, 69
process, 11
process interaction, 9
process migration, 165, 169
program activity graph, 83, 88
pseudo-random number generator, 115
PVM, 164
  daemons, 164
  tasks, 164
random number generator, 115
relative efficiency, 118
resource management, 11, 154, 160
rollback strategies, see cancellation strategies
scale-invariant properties, 133
scaling exponent, 133
scheduling, 12
  dynamic, 12, 162
  global, 12, 161
  local, 12
  optimistic simulation, 39
  static, 12, 162
self-organized criticality, 133
  finite-size scaling, 142
self-similar properties, 133
separation of time scales, 135
sequential fraction, 78, 91
shape vector, 79, 90
shared memory, 10
simulation
  continuous, 5
  discrete event, 5
  event-driven, 8
  Monte Carlo, 5
  predictability, 4
  realizability, 4
  time-driven, 7
  well defined, 4
simulation languages, 51
simulation libraries, 53
simulation model, see model
simultaneous events, 70
SOC, see self-organized criticality
space-time diagram, 81
speedup models
  absolute, 126
  memory-bounded, 67, 78
  relative, 118
state queue, 63, 68
state saving, 34
  copy, 34, 68
  hybrid, 37
  incremental, 35, 67
  periodic, 34
straggler, 30
super-critical speedup, 33, 99
system, 3
  components of a, 3
  continuous, 3
  discrete, 3
  environment, 3
  state, 3
task, 11
task precedence graph, 78
thrashing, 35, 37, 123
throttling, 35, see optimism control
Time Warp, 28, 30–31, 56, see AP-SIS
time-driven simulation, 7
timestamp, 21
validation, 2
virtual environments, 13, 187
virtual time, 29–30
virtual time window, 124, 147, see optimism control
well-defined, 26
wide-area networks, 157
world view, 8
  activity scanning, 9
  event scheduling, 8, 56
  process interaction, 9, 56, 81