

Index

A

Acoustic fingerprint, 25
Adaptability, 315–317, 320, 324
Advanced process control, 219
Anomaly diagnosis, 110
Artificial intelligence, 216, 218, 221
Assembly, 429
Auditory Display, 18–20, 22, 23, 25, 29, 30
Automatic guided vehicles, 175, 176
Automotive, 330, 332, 333, 338
Automotive Industry, 48, 52, 56–58
Autonomous control, 163
Autonomous movement control, 175, 177, 181, 185

B

Bounded-error approach, 496, 499, 500
Box-Jenkins method, 35, 41

C

Capacity adjustment, 136
Capacity management, 308, 535–537
Characteristic equation, 138
Clearing function, 77–82, 84–87
Cloud computing, 418, 419, 425
Cluster concept, 365
Clustering, 190, 193, 195, 198–200
Company layout, 486, 492
Complex adaptive logistics systems (CALs), 162
Complexity, 233, 385, 388, 390–392, 394, 395, 396
Complex network science, 47, 50, 52, 59
Configuration, 248

Configuration model, 315, 318, 319, 321, 323, 324
Constitutive characteristics, 316, 317, 320, 321
Constitutive criteria, 322
Continuum models, 77
Control-theoretic dynamic models, 138
Cooperative partnerships, 47
Coordination, 301, 304–310, 312
Correlation analyses, 225, 227
Croston method, 39
Cybernetic support systems, 449

D

Data, 445
Data exchange, 328, 329, 330
Data mining, 193, 197, 216, 222, 224, 203–207, 209
Decentralized, 402
Decentralised manufacturing, 367, 371
Decentralised manufacturing networks, 371
Decentralised production networks, 371
Decentralized mini-factories, 363
Decentralized control loops, 447
Decentralized electricity trading, 342–344, 350, 354
Decision-making, 331, 343, 350–352, 354, 387, 388, 444
Decision making time
 autonomous process, 151
 behaviour of embedded control device, 148
 centralized process, 151
 change of beneficialty, 156
 communication time, 150
 components of, 149
 decision makingcosts of, 148

D (*cont.*)

- decision makingtime of, 148
- experimental results, 154
- experiment's failure behaviour, 152
- experiment's load balancing, 152
- experiment's order dispatching, 153
- experiment's procedure, 153
- processing time, 150
- QLE decision method, 150
- selected experimental parameters, 151
- signal propagation, 150
- simulation of, 151
- thesis of influence, 148
- Decision support, 448
- Defects, 273
- Delay coordinate embedding, 37
- Demand uncertainty, 455, 456, 460
- Design principles, 3, 5, 7, 9, 13
- Development network, 288, 294
- Digital factories, 403
- Dispatching rule, 91–94, 96, 97, 100, 102
- Dispatching rules with gaussian process, 96
- Disturbances, 470–476
- Due date reliability, 475, 479
- Dynamic capabilities, 520
- Dynamic manufacturing networks, 247
- Dynamic production scheduling, 107
- Dynamic system, 37

E

- Efficiency, 3–13, 47, 51, 52, 56
- Efficiency of production, 449
- Electric mobility, 47–50, 53–56, 58, 59
- Enterprise target systems, 282
- Environmental changes, 315
- Environmental impact, 371
- Evolution, 4, 8–11
- Evolutionary strategies, 190, 197, 200
- Exponential smoothing, 35, 41

F

- Failure modes and effects analysis tool (FMEA), 259, 263–266, 268
- Flexibility, 316–318
- Flow, 63–65, 69
- Flow production, 216
- Fractal manufacturing, 362

G

- Gaussian process, 91, 92, 95
- Gaussian process regression, 96, 102

- Global footprint design, 386, 391
- Globalisation, 355, 356
- Global production, 386–396
- Global production/global scale production network, 233
- Grid system, 342, 343, 346, 351, 353

H

- High resolution, adaptive production control, 449
- High resolution data, 449
- History matters, 520
- Human subject experiments, 350, 351, 354
- Hybrid Simulation, 404

I

- Ib-transit stocks, 328, 329
- Increasing returns, 520
- Industrial case study, 105, 121, 122, 127, 131
- Industrial product-service system (IPS²), 415, 416
- Influences, 315, 318–321, 323, 324
- Influx, 79–82, 85, 86
- Inline quality control, 216
- Intelligent execution center, 108
- Intelligent sensor technology, 449
- Interactive computer graphics, 447
- Intercompany planning, 301
- Intermittent demand, 34, 39
- Inter-operation time, 435
- IPS²-Execution System, 421
- ISO 9001, 259, 262, 266, 269, 270
- ISO TS 16949, 259, 262, 266, 268–270

J

- Jidoka, 216, 219
- Job shop manufacturing, 445

K

- Knowledge, 520
- Knowledge discovery in databases, 19, 205, 207, 219
- Knowledge management, 519
- Kowalo, 316
- KPIs, 451

L

- Lead time, 469–475
- Lead time syndrome, 470–472

Load, 79, 80, 87
 Lock-in situations, 519
 Logistic analysis, 18, 19
 Logistics as a service, 301, 302
 Logistics chains, 315–322
 Logistics configurations, 315, 318,
 320–322, 324
 Logistic model, 429
 Logistic performance, 429
 Logistic performance measures, 148
 Logistic regression, 225, 227
 Low volume and high mix production,
 190–192

M

Makespan distribution, 123, 130, 131
 Manufacturing, 536, 542, 543
 Manufacturing control, 203, 204, 211–213
 Manufacturing flexibility, 520
 Manufacturing paradigms, 355, 356, 358
 Manufacturing systems, 3, 4, 7, 8
 Markovian activity networks, 121
 Mass customization, 355–357, 373
 Material flow, 329, 331, 333, 334
 Maturity levels, 272–275, 278, 280
 Maturity model, 278
 Metabolism, 3–9, 11–13
 Microelectronics, 259–265, 267, 269
 M/M/1 queue, 8–082, 84
 Model, 429
 Modeling, 77, 78, 83, 87
 Modular software architecture, 448
 Monitoring, 451
 Monte carlo sampling, 130
 Moving average, 35, 41
 Multi-agent simulations, 343
 Multi-objective optimization, 195, 196, 199
 Multivariate statistics, 224

N

Networks, 3–13, 63–67, 73, 75, 272, 273,
 275–277, 281
 Network architecture, 47
 Nonlinear dynamics methods, 36, 41

O

Online scheduling controller, 105, 107
 Operations research, 386, 388, 389, 391, 396
 Operation time, 438
 Optimization, 64, 75
 Order-oriented view, 17, 20, 24, 26

Order sequencing, 27, 29
 Organizational structure, 482, 486–489, 492

P

Parameter estimation, 495, 498–501
 Parameter mapping sonification, 17, 18, 20
 Patterns within the data, 451
 Pedestrian dynamics, 175–178, 180, 181, 185
 Phase type approximation, 126, 129–131
 Photovoltaic power, 341
 Planning, 248, 372
 Planning rules, 203, 204, 206, 207, 211–213
 Prediction models, 223
 Problem statement, 457
 Procedure model, 206
 Process control, 217
 Process management, 481, 482, 492
 Product design, 495, 496, 498, 500, 502, 504
 Product family formation, 190, 192–195, 198
 Product model, 277
 Production concepts, 355, 359, 365, 366
 Production disturbances, 474
 Production planning, 77–79, 87, 203, 204, 455,
 456, 461, 465, 466
 Production leveling, 190, 191
 Production network, 233, 288, 289, 295,
 385–396, 508
 Production planning and control, 444, 471
 Propagates, 273

Q

Quality control, 495, 496, 500, 501, 504
 Quality level, 223, 224
 Quality management systems, 262, 269
 Quality prediction, 222
 Quality strategy, 273
 Queue length estimation (QLE), 150, 157, 158

R

Real time, 327–329, 331–333, 337, 338
 Reconfigurable manufacturing
 systems, 105, 106
 Redundancy, 63–67, 75
 Regression analyses, 225, 227
 Renewable energy, 341, 342
 Rescheduling, 108, 114–118
 Resource-oriented view, 21, 22
 Review, 355, 365
 Robust modelling, 495
 Robustness, 3, 4, 8–11, 13, 47, 52, 56–58, 63,
 64, 75, 162, 537, 542

R (*cont.*)

Robust optimization, 455, 456, 466
 Robust scheduling, 121, 122

S

Segmented manufacturing, 361
 Service oriented architectures, 304
 Scenario analysis, 508
 Scheduling, 91–94, 96, 102, 373
 Schedule reliability, 429
 Self-optimization, 448
 Self-optimizing, 447
 Shop floor, 444
 Simulation, 92, 94, 95, 98–102, 140, 327
 Site level quality control loops, 279
 Small and medium sized batch production, 445
 Small and medium sized enterprises, 301–304
 Smart-grid, 341, 342
 Smart networks, 289
 Social force model, 175, 177, 178, 180, 181, 185
 Social surplus, 342, 346, 351, 353, 354
 Standard deviation, 470–476, 479
 Statistical analyses, 224
 Statistical process control, 263, 264
 Strategies, 281
 Strategic foresight, 508
 Strategic network, 363, 366
 Structural complexity, 47
 Stochastic scheduling, 123, 126
 Supply chain, 315–317, 319
 Supply chain management, 317, 359, 360
 Supply chain planning, 301–303, 312
 Supply net management, 301

Supply network, 327–329, 331, 333
 Supervised learning, 222
 Sustainability/sustainable development, 234, 238
 Synchronization, 63–65, 68, 72, 75
 Synchronization of information, 329
 Synchronous view, 21, 22, 24, 25, 30
 System dynamics, 508

T

Time series data, 221
 Time synchronicity, 429
 Toyota production system, 216
 Trade-offs, 536, 542–544
 Transportation, 63, 65

U

Uncertainty, 498, 500–502, 504

V

Value-added networks, 272
 Value stream, 447
 Vienna University of Technology, 316
 Virtual Enterprise, 364
 Virtual experiment fields, 327, 331, 334–337
 Visualization of data, 446

W

Weak signals, 508
 Work-In-Progress (WIP) regulation, 136