

Index

- Allowable Stress Design 82–4, 93, 95,
107, 119, 134–5, 147–54, 174–5
- Arch 17
- Augmented Lagrangian 10, 78, 87–92,
133
- Beam 3–7, 10, 19, 21–4
- Bilevel parallel fuzzy GA 128, 142–6,
160–3
- Box girder bridge 15–16
- Branch and bound method 114
- Bridge 14, 15, 19
- Cache coherency 125, 127
- Cache memory 125, 128
- Cache miss 138
- Cantilever bridge 15
- Column 11
- Composite floor 53–75
- Compromise programming 113
- Concrete
beam 3–7, 10, 19
bridge 19
column 11
frame 12–14, 19
pipe 17
slab 3–5, 7, 19
tensile member 17
transmission pole 11
- Concurrent genetic algorithm (GA) 134
- Connection Machine 130, 134
- Continuum-type optimality criteria
(CTOC) 10, 13
- Counter propagation neural network
(CPN) 68–9
- Course-grained parallelization 128
- Cray YMP 134
- Crossover 92, 139–40, 160
- Deterministic cost optimization 20
- Discount rate 170
- Distributed computing 130
- Distributed genetic algorithm (GA) 134
- Distributed memory system 130, 134
- Distributed shared memory
multiprocessor 125, 128
- Dynamic load balancing 138
- Dynamic programming 22
- Effective length factor 107
- Elastoplastic analysis 19
- Euclidean distance 16
- European steel design code 107, 136
- Evolutionary computing, *see* Genetic
algorithm (GA)

- Feasible conjugate gradient 5
- Feasible directions 17, 19
- Fine-grained parallelization 128
- Floating point GA 63
- Folded plate 17
- Fork-and-join paradigm 129
- Frame 12–14, 19
- Fuzzy augmented Lagrangian GA 87–92
- Fuzzy genetic algorithm (GA) 78–99, 136–55
- Fuzzy logic 20, 78–80, 170
- Fuzzy logic-based optimization 20, 80
- Fuzzy membership function 85–7
- Fuzzy set theory 78–81

- GA, *see* Genetic algorithm (GA)
- General geometric programming 7, 15
- Genetic algorithm (GA) 78–99, 133–4, 136–55
- Global optimum 78, 90, 133
- Goal programming 113

- High-rise 93–5, 118–22, 147–55, 174–5
- Hypercube architecture 125

- Integer programming 6
- IRIX operating system 117

- Lagrange multiplier method 4–5, 7
- Latency 127, 161
- Life-cycle cost 1, 19, 167–9
- Life-cycle cost optimization 19–20, 165
- Linear programming (LP) 4, 17
- Load and Resistance Factor Design (LRFD) 135–6, 147–54, 174–5
- Loop unrolling 130

- Master processor 139–40, 145
- Master thread 129
- Max-min procedure 81, 105, 108, 113
- Membership function 81, 85–7, 110–14
- Memory bandwidth 134
- Memory hierarchy 127
- Message Passing Interface (MPI) 128, 130, 138–46
- Migration scheme 140–2, 146–7, 159–60

- Minimax method 16, 113, 172
- Moment-resisting frame 107, 119–22, 135–6, 147–54
- Multi-attribute utility method 113
- Multi-criteria cost optimization 101–23
- Mutation 92, 139–40, 160

- Neural dynamics model of Adeli and Park 65–7
- Nonuniform memory access (NUMA) 127

- OpenMP 128–9, 136–8
- Optimality criteria 10, 13
- Origin 2000 125, 137–8, 142

- Page migration 127, 138
- Page replication 127, 138
- Parallel computing 125–32
- Parallel processing performance optimization 130
- Parallel virtual machine (PVM) 138
- Pareto optimal 112–14
- Partial prestressing 5, 6, 10
- Penalty function method 87–8
- Piecewise linear programming 14
- Piecewise linear regression analysis 83
- Piecewise parabolic regression analysis 83–4
- Plate girder 21–4
- Post-tensioned prestressed concrete 3
- Prestressed concrete beam 4
- Prestressed concrete bridge 14–15
- Probability of failure 18
- Processor farming scheme 138–40, 158–9
- Projected Lagrangian 19

- Quadratic fuzzy membership function 85

- Racing condition 129
- Radius of gyration 83
- Reliability-based optimization 18–20
- Reliability theory 18
- Router 125
- Rule-based system 77

- Sequential linear programming (LP)
 - 17
- Sequential optimization method
 - 113
- Sequential quadratic programming
 - 13–14
- Sequential unconstrained minimization technique (SUMT)
 - 12–13,
 - 16–17, 19
- SGI Origin 2000
 - 93, 117, 134
- Shared memory computer
 - 128
- Shear wall
 - 17
- Silicon Graphics Inc.
 - 125
- Simplex method
 - 16
- Single-program multiple data (SPMD)
 - 128
- Slave processor
 - 139–40, 145
- Slave thread
 - 129
- Space truss
 - 82–4, 118–19
- Steel
 - beam
 - 21–4
 - high-rise structures
 - 118–22, 147–55,
 - 174–5
 - plate girder
 - 21–4
 - truss
 - 77, 93, 118–19
- Subroutine inlining
 - 131
- Synchronization
 - 128
- Thread
 - 129, 137
- Truss
 - 77, 93, 118–19
- Tube-in-tube system
 - 149
- Two-point crossover
 - 92
- Virtual ring topology
 - 140–2
- Voided slab
 - 16
- Water tank
 - 16–17
- Wind load
 - 19, 95, 122, 150

