

Index

A

- acceleration response spectra (ARS) 398
- accelerograms 257
- analog-to-digital converter (ADC) 104
- approximate reasoning 133
- artificial
 - accelerogram 73
 - Gaussian noise 383
 - intelligence 62
 - life algorithm 59
 - neural network (ANN) 84, 102, 134, 158, 170, 343–344, 363, 394–396, 399
 - record 15

B

- back-propagation neural network (BPNN) 363, 390, 400
- building habitability evaluation 134

C

- cascade BPNN 366
- chromosome 215
 - representation 278

- codified seismic design 39
- collapse prevention (CP) 50
- condition rating 201
- continuous wavelet transforms (CWT) 82
- controllable fluid dampers 103

D

- deficiency rating 200
- degrees of freedom (DOF) 372
- demand to capacity (D/C) 46
- deterministic databases 39
- digital filter banks 82
- discrete wavelet transform (DWT) 81, 82
- displacement response spectra (DRS) 398
- dynamic
 - analysis 81
 - model 26
 - load 102

E

- earthquake 2
- earthquakeengineering 67, 71
- encoding 59
- Eurocode 3 5
- Eurocode 8 5, 253, 398

- evolution
 - strategy (ES) 11
- evolutionary
 - algorithm (EA) 2, 42, 111, 197, 249, 399
 - tools 1
- F**
- f-granular 195
- fast wavelet transforms (FWT) 81, 82
- finite element method (FEM) 363
- FIP CEB proposals 191
- FORM 37
- Fourier
 - series 280
 - transform (FT) 82
- freedom model 236
- fuzzy
 - logic (FL) 102, 192, 249
 - set 132, 139
 - system 211, 399
- FWT algorithm 83
- G**
- genetic algorithm (GA) 47, 67, 102, 192, 242, 278, 318, 399
- global response surface 24
- granule 195
- H**
- hybrid
 - base isolation system 103
 - evolutionary algorithm (HEA) 211
 - mass damper (HMD) 103
- I**
- IASC-ASCE Benchmark structure 174
- immediate occupancy (IO) 50
- independent component analysis (ICA) 164
- information encoding 59
- Institute of Earthquake Engineering and Engineering Seismology (IZIIS) 130
- intelligent
 - control 102
 - optimal control 101
- intensity measure (IM) 260
- inverse wavelet transform (IWT) 81, 84
- IRELAN 28
- iterative scheme 358
- K**
- Kalman filter (KF) 404, 428
- kernel spread 172
- Kohonen network 142
- L**
- life-cycle cost (LCC) 231, 246
- linear dynamic procedure 4
- linguistic variable 132, 195
- Lipschitz condition 278
- local soil conditions 272
- M**
- mean-square-error (MSE) 406
 - error 389
- modified genetic algorithm 82, 318
- Monte Carlo simulation (MCS) 60, 71, 249
- morpho-typological features 200
- multi-modal response spectrum (MmRS) 4
- multilayer perceptron 363, 400
- multistory shear buildings 358
- N**
- natural record 15
- neural approximation 407
- neural network 22–
 - 24, 69, 132, 249, 399
- neuro-fuzzy system 133
- neurocomputing 363, 399–400
- neuron 250, 356
- Newmark β method 236
- non-Gaussian stochastic fields 249
- nonlinear
 - dynamic procedure (NDP) 4
 - Gauss-Newton scheme 282
- nonstationary components 82
- novelty detection process 173

O

ordinary moment resisting frame 49

P

parallel fuzzy digital signal processing (DSP) boards 105
 particle swarm optimisation 66
 pattern recognition (PR) 63, 162
 peak
 ground
 acceleration (PGA) 6
 velocity (PGV) 6
 performance-based
 design 22–23, 39
 earthquake engineering (PBEE) 3
 principal component analysis (PCA) 429

R

random white Gaussian noise 331
 Rayleigh proportional damping 329
 RC structure 190
 reliability
 levels 23
 theory 23
 root-mean-square-error (RMSE) 406
 Rprop algorithm 248

S

scanner 1, 42, 59, 362, 433
 search space reduction method (SSRM)
 318, 322
 seismic
 design 1
 loading 6
 performance 44
 response 44
 risk mitigation 188
 waveform inversion algorithm 271
 seismogram inversion 273
 algorithm 272
 semiactive tuned mass dampers (SATMD)
 103
 sensitivity analysis phase 11
 SH waves 277
 simulated annealing 102

smart base isolation 103
 soft computing 69, 105, 124, 133, 192,
 249, 344
 sphering 165
 statistical learning theory (SLT) 164
 structural
 dynamic analysis 394
 optimization 2, 61
 reliability 61
 risk minimization (SRM) principle
 168, 171
 support
 vector 62
 classifier 71
 machine 69, 158, 171
 swarm optimization 102

T

time-frequency localization 280

V

variable orifice damper 103
 vector machine 59
 velocity response spectra (VRS) 398

W

wavelet neural network (WNN) 81, 87
 wavelet transform (WT) 82, 280
 weak motion data inversion 273
 whitening 165

Y

Young's modulus 373