

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

spherling 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