
Index

- ABC algorithm in C++, 23
- ABC algorithm in Matlab, 20
- ACO, 2
- active agents, 309
- adaptive local-decision, 178
- aggressive reproduction strategies, 110
- Ant colony optimization, 2
- Artificial Bee Colony, 18
- artificial hunters, 220
- attacking the prey, 210
- attractants, 33
- attraction, 294
- attraction movements, 296
- attraction strength, 165
- attractiveness, 165
- attractiveness term, 165
- awareness probability, 99
- BA, 121
- bacteria, 32
- bacterial foraging optimization, 31
- bat algorithm, 43
- bat-inspired algorithm, 121
- behavior of glowworms, 175
- behavior of the cats, 56
- best solution, 71
- BFO, 31
- bio-inspired algorithm, 98
- biologically inspired, 2
- breaking or weakening, 136
- brooding parasitism, 109
- Brownian motion, 33
- bubble-net attacking method, 324
- bubble-net feeding method, 323
- butterfly adjusting operator, 252
- butterfly flutter, 252
- C++, 82, 106
- Cat Swarm Optimization, 56
- caterpillar, 250
- chase-swarming, 85
- chasing, 85
- Chebyshev distance, 60
- chemotaxis, 33
- chick, 75
- chicken, 75
- Chicken Swarm Optimization, 71
- chicken swarms, 71
- chrysalis, 250
- clans, 151
- cockroach swarm optimization, 85
- collective information, 166
- collective wealth, 308
- comfort zone, 194
- communal web, 293
- constrained engineering optimization, 97
- constraint-handling techniques, 172
- convergence, 43
- count of dimension to change, 56
- cross county moment, 250
- Crow Search Algorithm, 97
- crows, 97
- cuckoo search, 109
- cuckoo species, 109
- decision variables, 267
- dense fog, 166
- dispersal, 33
- dispersing behaviour, 135
- dispersion, 85
- Dispersive Flies Optimisation, 135
- diversification, 210
- dominant hierarchy levels, 208

- dominant male spiders, 294
- dominant structure, 207
- double-loops, 324
- DVBA, 121
- dynamic motion, 193
- Dynamic Virtual Bats Algorithm, 121
- dynamical system theory, 44
- dynamically changing environments, 135
- E. coli, 32
- echolocation, 44
- echolocation of microbats, 43
- elephant, 150
- elimination, 32
- elimination probability, 34
- employed bees, 17
- encircling prey, 324
- equilibrium state, 194
- escaping from light, 85
- Euclidean distance, 60
- exploitation, 18, 195, 325
- exploiter bat, 121
- exploration, 18, 195, 210
- exploration-exploitation, 268
- explorer bat, 121
- exponential absorption, 165
- facing a threat, 135
- family structure of elephants, 149
- feet, 150
- females, 294
- FEs, 124
- firefly algorithm, 163
- fitness value, 71
- flagella, 32
- flagellum, 32
- flashing behaviour, 163
- flashing firefly, 166
- flight length, 99
- fluctuation, 17, 18
- food, 32, 150
- food source, 2
- foraging, 17, 32
- foraging activity, 232
- foraging motion, 234
- foraging theory, 32
- formation of the swarms, 136
- frequencies, 44
- frequency, 124
- frequency range, 125
- Frequency tuning, 44
- frequency variation, 45
- function of evaluation, 124
- global minima, 258
- global version, 72
- Glowworm Swarm Optimization, 175
- Grasshopper Optimization Algorithm, 193
- Grey wolf optimizer, 207
- grey wolves, 208
- grey wolves pack, 207
- Griewank function, 37
- group hunting, 220
- group of friends, 308
- hen, 81
- herding, 151
- herding behaviour, 151
- homing for prey, 44
- host bird, 110
- host species, 110
- humpback whales, 323
- hunger behavior, 86
- hunting, 208
- hunting process, 209, 220
- Hunting Search, 219
- hunting solution vector, 227
- hunting strategies, 323
- IDVBA, 122
- inactive agents, 309
- increment rate, 124, 125
- increment rate divisor, 124, 125
- inertia weight, 86, 268
- infeasible, 252
- influence probability, 297
- intensity of bio-luminescence, 176
- interaction, 18
- interactions, 17

- interactions between agents, 308
- inverse-square law, 165
- krill herd, 231
- krill in a herd, 231
- krill swarm, 232
- Kuhn-Tucker problem, 226
- Lévy flights, 109, 110
- Lévy flight, 324
- Lagrangian movements, 232
- Lagrangian multipliers, 172
- leader of the group, 208
- leader salp, 281
- leadership, 151
- learning coefficient, 267
- Levy flight, 252
- light intensity, 166
- light intensity variation, 165
- limit, 20
- linear time complexity, 308
- loudness, 44
- low frequency sound, 150
- lower bounds, 125
- luciferin value, 190
- males, 294
- mammals, 150
- Manhattan distance, 60
- Markovian framework, 44
- mating, 294
- Matlab, 82, 106
- matriarch, 149
- memory, 100
- metaheuristic, 97
- microbats, 44
- migration behaviour, 250
- migration operator, 251
- milkweed butterfly, 250
- minimal convergence criteria, 308
- minimalist update equation, 135
- mining game, 308
- Monarch butterfly, 250
- monarch butterfly optimisation, 250
- movement attributed to the wind, 194
- movement strategies, 193
- movements, 85
- multi-agent global search, 308
- multiple peaks, 180
- mutual cooperation, 85
- naturally self-organise, 309
- navigation and hunting, 44
- negative feedback, 17, 18
- neighborhood, 268
- Nelder-Mead search, 294
- Newton's motion law, 282
- noisy environments, 135
- non-convex, 37
- non-convex function, 157
- non-dominant spiders, 294
- non-stationary, 135
- North American, 250
- noxious, 32
- nutrients, 32
- Nymphalidae, 250
- objective function, 99, 123, 126, 273
- onlooker bees, 17
- optimisation swarm intelligence
 - algorithm, 308
- optimization problems, 71
- organic compound, 3
- pairwise social interactions, 194
- particle, 272
- particle swarm optimization, 265
- pheromone, 3
- physical diffusion, 234
- population-based algorithms, 135
- position, 81, 100
- position vector, 44
- positive feedback, 17, 18
- prey capturing, 294
- pseudo-code of the ABC, 19
- pulse emission rate, 44
- pulse emission rates, 44
- random diffusion, 232
- range of mating, 297
- rapidly congregate, 309

- Rastrigin function, 157
- repellents, 33
- reproduction, 33
- reproductivity probability, 110
- repulsion, 296
- repulsion movement, 296
- repulsion zone, 194
- residual salps, 281
- resting position, 56
- ring topology, 60, 269
- robustness, 308
- rooster, 75
- roulette wheel selection, 13
- rumbling, 150
- ruthless, 85

- salp swarm algorithm, 280
- scaling factor, 166
- scope width variable, 124
- scope width vector, 124
- scouts, 17
- search for prey, 324
- search moves, 164
- search points, 124
- search scope, 122
- search space, 32, 99, 157
- security, 152
- seeking memory pool, 56
- seeking mode, 56
- seeking range of the selected dimension, 56
- seismic waves, 150
- selecting sleep place, 208
- selective neighbor interaction, 177
- self-organization, 17
- self-position consideration, 56
- sensing distance, 234
- separation, 152
- slow movements, 193
- social animal, 151
- social behavior, 265, 323
- social interactions, 194
- social members, 293
- social neighborhood, 60, 269
- social spider colony, 293
- Social spider optimization, 293
- solution search space, 323
- source code, 82, 126
- source of food, 193
- Sphere function, 200
- Stochastic Diffusion Search, 308
- superorganisms, 1, 2
- swarm, 267
- Swarm Intelligence, 279
- Swarm intelligence, 17
- swarm intelligence, 207, 293, 307
- swarm of mobile robots, 176
- swarm robotics applications, 176
- swarm-intelligence, 231
- swarming, 33, 85
- swarming behaviour, 135
- swim, 32

- termination criteria, 268
- termination criterion, 217
- time-dependent Lagrangian model, 233
- tracing mode, 56
- traveling salesman, 7, 11
- tropical fireflies, 163
- tumble, 32

- ultrasonic pulses, 44
- uniform distribution, 32, 152, 252
- unit vectors, 124
- upper bounds, 125
- upward-spirals, 324

- velocities, 124
- velocity vector, 44, 273
- vibrations, 151, 294
- virtual food, 233
- visibility distance, 166

- wave direction vectors, 124
- wave vectors, 124, 125
- wavelength, 124, 125
- wavelength range, 125
- weight of each spider, 295
- whale optimization algorithm, 323

- zone of attraction, 194