

Appendix Table of Notations

Symbols	Interpret
X_i	The positions of the i th Individual
X_{rand}	The position of randomly selected individual
X_{rabbit}	The global solution at the last iteration
X_m	The average positions of all individuals
ub	The upper bounds of the search space
lb	The lower bounds of the search space
N	The number of individuals
D	The dimension of individuals
T	The maximum iteration
t	The current iteration
E	The escape energy of the prey
E_0	The initial escape energy of the prey
$rand_i(i=1,2,3,4,5)$	The uniform random numbers in (0,1)
q, r	The random values in (0,1)
$Jump$	The jump strength of the prey
$LF()$	The levy flight function
S	The vector of uniform random numbers in (0,1)
μ, v	The random values in (0,1)
β	The default constant of the levy flight function, which value is 1.5
$\Gamma()$	The gamma function
$prey_i$	The positions of the i th prey
$elite_i$	the current fittest solution of each individual
$stepsize_i$	The step size of the prey's movement
$Rand_B$	The vector of normal random values in [0,1]
$Rand_L$	The vector of Lévy random values in [0,1]
$Rand$	The vector of uniform random values in [0,1]
P	The default constant, which value is 0.5
CF	The adaptive parameter
U	The binary vector
$FADs$	The default constant, which value is 0.2
X_O	The opposite number
X_{QO}	The quasi-opposite number
X_{QR}	The quasi-reflection number
c	the midpoint of the search space
X_{RO}	the random opposite number
X_{DO}	The dynamic opposite number
r_1, r_2	The uniform random values
w	The default constant, which value is 1.4
X_{DOL}	The improved dynamic opposite number

$X_{elite,i}$	The current fittest solution of each individual
S	The upper threshold for no updates