Notations

best – Index of the best vector in the current population
bin – Binomial crossover
\( C_m \) – Convergence measure
\( C_r \) and \( p_c \) – Crossover probability
\( D \) – Dimension of the problem
\( DE/a/b/c \) – A Differential Evolution variant with base vector ‘\( a \)’, ‘\( b \)’ number of vector differences and crossover scheme ‘\( c \)’
\( E(Var(x)) \) – Expected variance of a population \( x \)
exp – Exponential crossover
\( F \) and \( K \) – Scaling factor or amplification factor
\( f_1 \) to \( f_{14} \) – Benchmarking functions 1 to 14
\( f(X_{i,G}) \) – Fitness value of the current vector \( i \) in the generation \( G \)
\( f(U_{i,G}) \) – Fitness value of the trial vector \( i \) in the generation \( G \)
\( G \) – Generation number
\( GMax \) – Maximum number of generations
\( i \) – Index of the current vector in the current population
\( j_{ran} \) – Random parameter index
\( MaxFE \) – Maximum number of function evaluations
\( mf \) – Migration frequency
\( MOV \) – Mean of objective function values
\( mt \) – Migration topology
\( n \) – Number of islands
\( nc \) – Total number of successful runs made by a variant for all the functions
\( nc_f \) – Total number of successful runs made by a variant for a function
\( nm \) – Number of migrants
\( ni \) – Number of islands
\( n_t \) – Number of trial vectors to be generated
\( nt_t \) – Total number of runs for each function (in this thesis \( nt_t = 100 \) runs)
\( nt \) – Total number of runs for all the functions (in this thesis \( nt = 14 \) functions * \( nt_t = 1400 \) runs)
\( NP \) – Population size
\( P_c(\%) \) – Probability of convergence
\( P_G \) – Population in generation \( G \)
\( Q_m \) – Quality measure
\( rand_j[0,1] \) – \( j^{th} \) Evaluation of uniform random number generator
\( r_{1}^{i}, r_{2}^{i}, r_{3}^{i}, r_{4}^{i}, r_{5}^{i} \) – Random numbers
\( r_{j}^{i} \) – \( j^{th} \) random number generated for the current vector \( i \)
\( rp \) – Replacement policy
\( SP \) – Success performance
\( sp \) – Selection policy
\( SR \) – Success rate
\( Survivor_{t} \) – Best vector among \( n_t \) trial vectors
\( U_{t,G} \) – Trial vector \( i \) in generation \( G \)
\( V_{t,G} \) – Mutant vector \( i \) in generation \( G \)
\( Var(x) \) – Variance of a population \( x \)
\( x \) – Current population
\( X_{t,G} \) – Current vector \( i \) in generation \( G \)
\( X_{best,G} \) – Best vector in generation \( G \)
\( Y \) – Intermediate population obtained after mutation
\( Z \) – The population obtained by crossing over the population \( x \) and \( Y \)
\( \langle \cdot \rangle_D \) – Modulo functions with modulus \( D \)