

This zip package is provided for the competition on the multiobjective multifactorial optimization. The description of these files are as follows.

1. MData:

This folder save the data of the rotation matrix that are used in the proposed test problems. There are four plan text files in this folder corresponding to four rotation matrixes respectively.

- 1) M_CIMS_2.txt: the data of \mathbf{M}_{cm2}
- 2) M_PIMS_1.txt: the data of \mathbf{M}_{pm1}
- 3) M_PIMS_2.txt: the data of \mathbf{M}_{pm2}
- 4) M_NIMS_2.txt: the data of \mathbf{M}_{nm2}

In each file of the rotation matrix, every line represents a row of the matrix, and any two adjacent values are separated by a whitespace.

2. SVData:

This folder saves the data of shift vectors that are used in the proposed test problems. There are five plan text files in this folder corresponding to five shift vectors respectively.

- 1) S_CIMS_2.txt: the data of \mathbf{s}_{cm2}
- 2) S_PHS_2.txt: the data of \mathbf{s}_{ph2}
- 3) S_PIMS_1.txt: the data of \mathbf{s}_{pm1}
- 4) S_PILS_2.txt: the data of \mathbf{s}_{pl2}
- 5) S_NILS_1.txt: the data of \mathbf{s}_{nl1}

In each file, the shift vector is saved in a line, and any two adjacent values in it are separated by a whitespace.

3. PF

This fold saves the data of the reference Pareto fronts, which are used to compute IGD values. There are four files in this folder corresponding to four different Pareto fronts.

- 1) convex.pf: for the Pareto front $f_2 = 1 - \sqrt{f_1}, 0 \leq f_1 \leq 1$
- 2) concave.pf: for the Pareto front $f_2 = 1 - f_1^2, 0 \leq f_1 \leq 1$
- 3) circle.pf: for the Pareto front $f_1^2 + f_2^2 = 1, f_1 \geq 0, f_2 \geq 0$
- 4) sphere.pf: for the Pareto front $f_1^2 + f_2^2 + f_3^2 = 1, f_1 \geq 0, f_2 \geq 0, f_3 \geq 0$

In each file, an objective vector over the Pareto front is put in a line. The first value in a line represents the first objective value, and the second value in a line represents the second objective value, and so on.

4. IGD.java

This is the Java source code for computing the IGD of a set of nondominated objective vectors.

The IGD.java can be compiled using the following command:

```
javac IGD.java
```

Then, run it using the command:

```
java IGD "pfs/circle.pf" "solutions.txt" 2
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Note that there are three parameters here, the first is the path of the reference Pareto front, the second is the path of the obtained nondominated objective vectors (the file format is the same with the file of the reference Pareto front), and the third is the number of objectives of the considered task.

5. AlgResults

The participant of this competition should submit such a folder (as a zip archive) to the organizers.

This folder should contain all the computational results obtained by the participant for the competition purpose. Specifically, there are following files in this folder.

- 1) IGDValues: The folder saves the IGD values. There are nine plan text files in this folder, each of which is for a test problem.
For example, CIHS_IGD.txt saves the IGD values obtained on the CIHS in all 30 runs, and each line in the file gives the two IGD values obtained in a single run, where the first IGD value is for T_1 and the second IGD value is for T_2 .
- 2) ConvCurve: The folder saves the convergence curves for each test problems. There are nine .fig files in this folder, each of which is for a test problem.
For example, there are two figures in CIHS_Conv.fig, where the first is for T_1 of CIHS and the second figure is for T_2 of CIHS. Each figure shows the evolution of average IGD values (over 30 runs) obtained for the corresponding task with the number of function evaluations or generations.
- 3) AlgSetting.txt: This plan text file save the parameters and their values used by the algorithm in the competition. Note that: a) if the horizontal axis of the convergence curves denote the number of generations, please also specify the number of function evaluations at each generation in this file; b) if the parameter settings used for the NIMS and NILS are different from those used for the other problems, please also specify this point in this file.

The folder “AlgResults” in this package provides all the above information about MO-MFEA .The participant can refer to this and prepare the results of his/her new algorithm for the submission.

6. MOMFOBenchmarks

This is the java implementation of the nine benchmark problems for the multiobjective multifactorial optimization.