Supplementary Material

A intelligent modelling framework to optimize the spatial layout of ocean buoy stations

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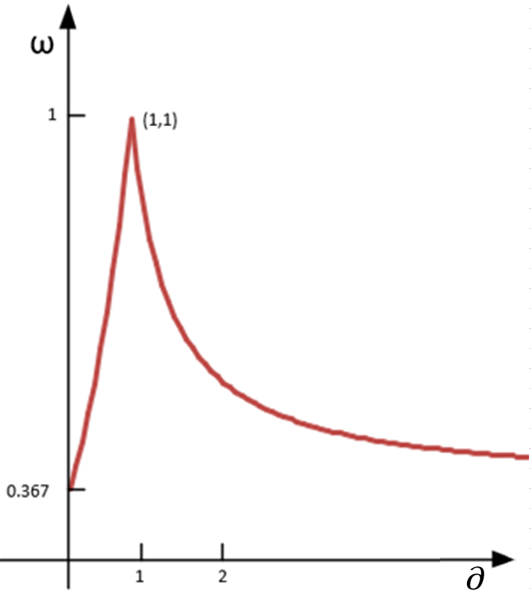
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# Supplementary Figures and Tables

## Supplementary Figures



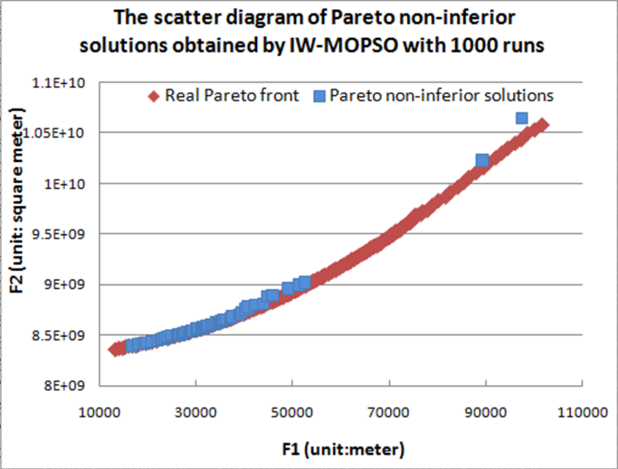
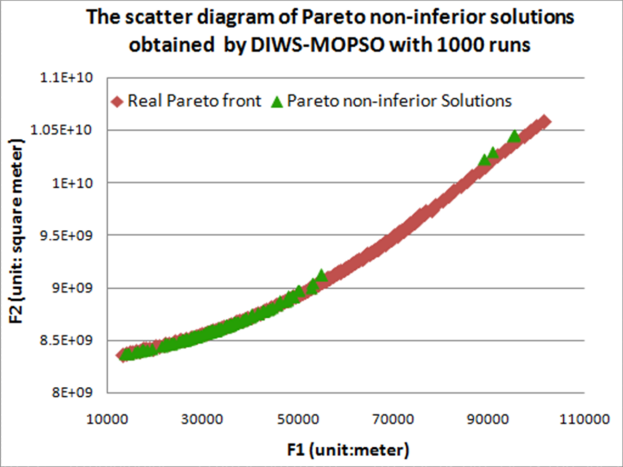
**Figure 1. The Spatial Neighborhood Model(SNM) of ocean buoy stations**



**Figure 2. Variation curve of the inertia weight factor () according to the change rate of the objective values()**

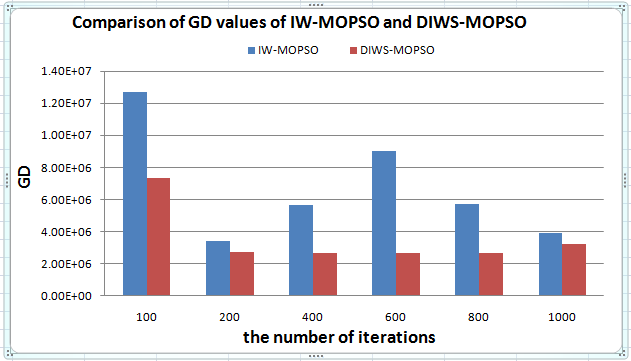


**Figure 3. Study area and feasible solution space (red triangles are the existing buoy stations and the red polygon area is the feasible solution space)**

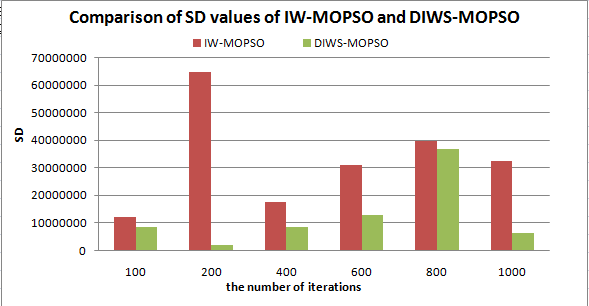
 

(a)Pareto non-inferior solutions of IW-MOPSO (b) Pareto non-inferior solutions of DIWS-MOPSO

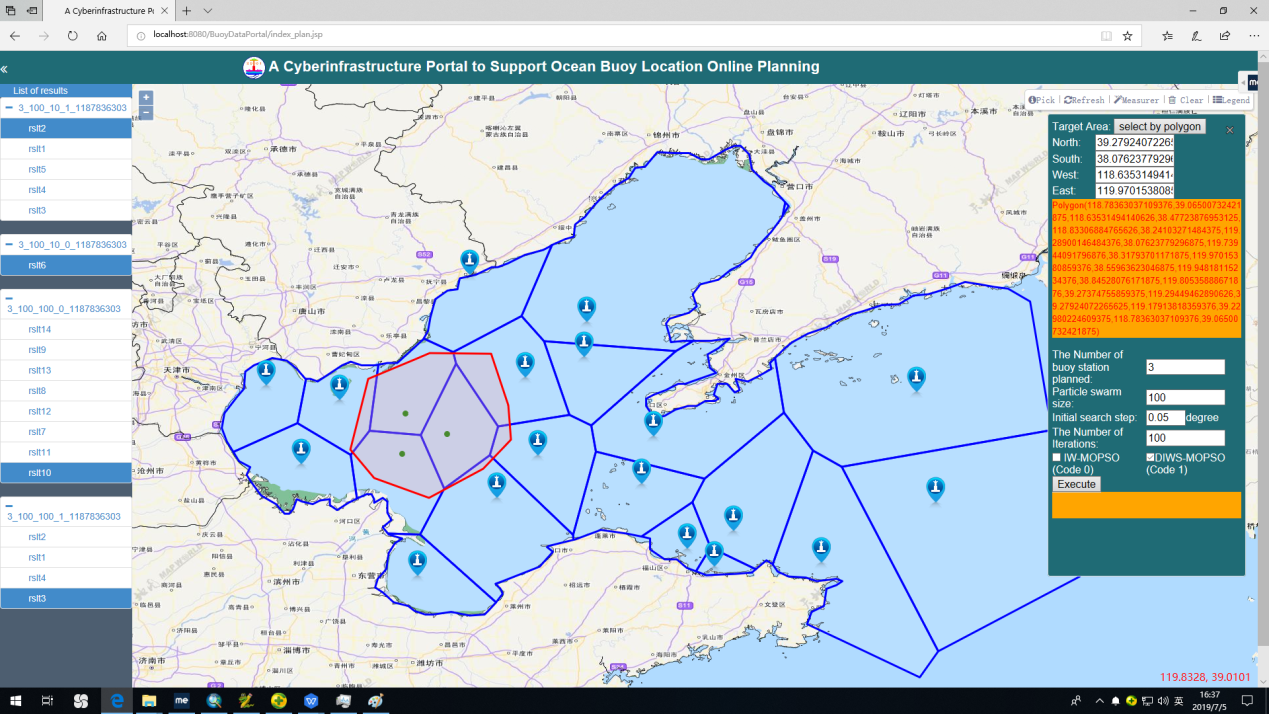
**Figure 4. The scatter diagrams of Pareto non-inferior solutions obtained by IW-MOPSO and DIWS-MOPSO with 1000 runs for single buoy station location selection**



**Figure 5. Convergence comparison of IW-MOPSO and DIWS-MOPSO algorithms by GD values**



**Figure 6. SD values comparison of IW-MOPSO and DIWS-MOPSO**



**Figure 7. Screenshot of a cyberinfrastructure portal aggregating the SNM, the ocean buoy location model and the algorithms of IW-MOPSO and DIWS-MOPSO to support ocean buoy layout planning**

1.2 Supplementary Tables

**Table 1. Comparison of selection results of multi-buoy stations location**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of buoy stations | IW-MOPSO | | DIWS-MOPSO | |
| a fine pattern | T1 | a fine pattern | T1 |
| 2 |  | 10 |  | 10 |
| 3 |  | 20 |  | 20 |
| 4 |  | 60 |  | 20 |
| 5 |  | 80 |  | 60 |
| 6 |  | 600 |  | 200 |

Note: 1. T is the number of iterations required for a fine pattern.

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