|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Problem size | J | I | B | F | NPS | | |  | MID | | |  | DM | | |  | SNS | | |
| NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D |
| Small | 8 | 2 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 | 3 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 | 3 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Medium | 15 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 25 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Large | 40 | 8 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 10 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 50 | 10 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 12 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 | 12 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 80 | 15 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 20 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Problem size | J | I | B | F | RAS | | |  | QM | | |  | Time | | |
| NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D |
| Small | 8 | 2 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| 10 | 3 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |
| 12 | 3 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |
| Medium | 15 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
| 20 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
| 25 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
| 30 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
| Large | 40 | 8 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
|  | 10 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |
| 50 | 10 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
|  | 12 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |
| 60 | 12 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |
| 80 | 15 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |
|  | 20 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Problem size | J | I | B | F | NPS | | |  | MID | | |  | DM | | |  | SNS | | |  | RAS | | |  | QM | | |  | Time | | |
| NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D | NSGA-II | Hybrid | MOEA/D |
| Small | 8 | 2 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 | 3 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 | 3 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Medium | 15 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 25 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 | 4 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 6 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Large | 40 | 8 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 10 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 50 | 10 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 12 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 | 12 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 80 | 15 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 20 | 4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |