I01

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | 0 | 0 | 0 | = | + | 0 | 0 | 0 | + | 0 | + | 0 | 0 | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | 0 | 0 | 0 | 0 |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | + | = | + | 0 | 0 | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | = | 0 | 0 | + |
| NNA | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | = | 0 | + |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | = | + |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = |

n1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | 0 | 0 | 0 | = | + | 0 | + | 0 | + | + | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | 0 | + | + | + | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | 0 | + | + | 0 |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | = | + | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | + | + | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | + | = |

Rsh1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | + | 0 | 0 | = | + | 0 | + | 0 | + | + | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | 0 | + | + | + | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | = | + | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | + | 0 | = |

I02

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | + | 0 | 0 | = | 0 | 0 | 0 | 0 | + | + | 0 | 0 | 0 | 0 |
| MABC | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 | 0 |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | 0 | 0 | 0 | 0 |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | = | 0 | 0 | 0 | 0 |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | = | 0 | 0 | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | = | 0 | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | = | 0 |
| WW | + | 0 | 0 | 0 | + | 0 | 0 | 0 | + | + | 0 | 0 | 0 | = |

n2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | + | 0 | 0 | = | + | 0 | + | 0 | + | + | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | 0 | 0 | + | + | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | 0 | + | + | + |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | + |
| IJAYA | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | = | + | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | = | + | + | + |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | = | 0 | + |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | = | + |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = |

Rsh2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 | 0 |
| MABC | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | 0 | 0 | + | + |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | = | + | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | + | 0 | = | 0 | + | + |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | = | + | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 | = |

Rs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | 0 | 0 | + | 0 | + | + | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | + | 0 | 0 | = | + | 0 | + | 0 | + | + | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | + | 0 | + | + | 0 | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | + | 0 | 0 |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | = | + | + | 0 | 0 |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | = | 0 | 0 | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | = | 0 | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | + | + | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 | = |

Iph

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | + | 0 | 0 | = | + | 0 | + | 0 | + | + | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | 0 | + | + | + | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | 0 | 0 | 0 | 0 | 0 |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | + | 0 | + | 0 | + | = | + | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | + | 0 | = | 0 | 0 | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | = | 0 | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 | = |

rmsre

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + |
| EBLSHADE | + | = | 0 | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | + | + | 0 | + | + | + | + | + | + |
| NDE | + | 0 | 0 | = | + | 0 | + | 0 | + | + | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | 0 | + | + | + | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | + | + | + | + |
| STLBO | + | 0 | 0 | + | + | + | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | + | + | + |
| IJAYA | + | 0 | 0 | 0 | + | 0 | + | 0 | + | = | + | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = |

Complex

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | + | + | + |
| EBLSHADE | + | = | + | + | + | + | + | 0 | + | + | + | + | + | + |
| ADELI | + | 0 | = | + | + | 0 | + | 0 | + | + | + | + | + | + |
| NDE | 0 | 0 | 0 | = | + | 0 | + | 0 | + | 0 | + | + | + | + |
| MABC | 0 | 0 | 0 | 0 | = | 0 | + | 0 | + | 0 | + | + | + | + |
| TLBO | + | 0 | 0 | + | + | = | + | 0 | + | + | + | + | + | + |
| GOTLBO | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 | + | 0 |
| STLBO | + | 0 | 0 | + | + | 0 | + | = | + | + | + | + | + | + |
| PSO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | 0 | 0 | 0 | 0 |
| IJAYA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | + | + | + |
| ISCA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | + | + | 0 |
| NNA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | + | 0 |
| CWOA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 |
| WW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = |

(I01, n1, Rsh1, I02, n2, Rsh2, Rs, Iph, rmsre)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Method | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| DE | = | 000000000 | 000000000 | 000000000 | +++00+0++ | 000000000 | 0++0+++++ | 000000000 | 0++0+++++ | 000000+00 | 0++0+++++ | 0++0+++++ | 0++0+++++ | +++0+++++ |
| EBLSHADE | +++++++++ | = | 000000000 | +++++++++ | +++++++++ | +++++++++ | +++++++++ | 000000000 | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ |
| ADELI | +++++++++ | 000000000 | = | +++++++++ | +++++++++ | +++++++++ | +++++++++ | 000000000 | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ |
| NDE | 00+++0+++ | 000000000 | 000000000 | = | +++0+0+++ | 000000000 | 0++0+0+++ | 000000000 | +++++++++ | 0++++0+++ | +++0+0+++ | 0++0+0+++ | 0++0+0+++ | +++0+0+++ |
| MABC | 000000000 | 000000000 | 000000000 | 000000000 | = | 000000000 | 0++0+00++ | 000000000 | 0++++0+++ | 000000000 | 0++000+++ | 0++0+0+++ | 0++0+00++ | 0++0+0+++ |
| TLBO | +++++++++ | 000000000 | 000000000 | +++++++++ | +++++++++ | = | +++++++++ | 000000000 | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ |
| GOTLBO | 000000000 | 000000000 | 000000000 | 000000000 | 000000000 | 000000000 | = | 000000000 | ++0+++++0 | 000000000 | 000000+0+ | 0+00+0+0+ | 0+00++00+ | 0000++00+ |
| STLBO | +++++++++ | 000000000 | 000000000 | +++++++++ | +++++++++ | +++++++++ | +++++++++ | = | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ | +++++++++ |
| PSO | 000000000 | 000000000 | 000000000 | 000000000 | 0000000000 | 000000000 | 000000000 | 000000000 | = | 000000000 | 00000000+ | 00000000+ | 00000000+ | 0000+000+ |
| IJAYA | 00000000+ | 000000000 | 000000000 | 000000000 | +++0++0++ | 000000000 | 0++0++0++ | 000000000 | +++++++++ | = | +++0+++++ | 0++0+++++ | 0++0++0++ | +++0++0++ |
| ISCA | 000000000 | 000000000 | 000000000 | 000000000 | 00000+000 | 000000000 | 0000000+0 | 000000000 | +00+++++0 | 000000000 | = | 0+00+0000 | 0+00++000 | +000++000 |
| NNA | 000000000 | 000000000 | 000000000 | 000000000 | +00000000 | 000000000 | +00000000 | 000000000 | +00+++++0 | 000000000 | +00000000 | = | 00000+000 | +000+0000 |
| CWOA | 000000000 | 000000000 | 000000000 | 000000000 | 000000000 | 000000000 | 000000000 | 000000000 | +00++0++0 | 000000000 | 000000+00 | 000000+00 | = | +000+0000 |
| WW | 000+00000 | 000000000 | 000000000 | 000000000 | 000+00000 | 000000000 | 00+000000 | 000000000 | 00++0+++0 | 000+00000 | 00+000000 | 0++000000 | 0+0000000 | = |