**Estimation of parameters for solar cells with S–shaped current–voltage characteristics using meta–heuristic algorithms**

Oleg Olikh

*Taras Shevchenko National University of Kyiv, 64/13, Volodymyrska Street, Kyiv, 01601, Ukraine*

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S1. Fitting results (lines) for the simulated current-voltage characteristic (symbols). The values *I*01= 1.6⋅10-6 mA, *n*1= 1.92, *R*p1 = 190 Ω, *I*02 = 0.16 mA, *n*2= 1.92, *R*p2 =190 Ω, *R*s = 45 Ω, *I*ph = 8 mA were assumed under simulation. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Fitting results (lines) for the simulated current-voltage characteristic (symbols). The parameters values from Sec.2.2.2 were assumed under simulation. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *I*01 value estimation by different algorithms on the IV curve set. Circles represent the *I*01 values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *n*1 value estimation by different algorithms on the IV curve set. Circles represent the *n*1 values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *R*p1 value estimation by different algorithms on the IV curve set. Circles represent the *R*p1 values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *I*02 value estimation by different algorithms on the IV curve set. Circles represent the *I*02 values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *n*2 value estimation by different algorithms on the IV curve set. Circles represent the *n*2 values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *R*p2 value estimation by different algorithms on the IV curve set. Circles represent the *R*p2 values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *R*s value estimation by different algorithms on the IV curve set. Circles represent the *R*s values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of *I*ph value estimation by different algorithms on the IV curve set. Circles represent the *I*ph values, which have been used in IV curve simulations, squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Fig.S2. Comparison of RMSPE value for different algorithms, applied to the IV curve set. Squares represent the median values, and stars represent the mean values. The colored regions correspond to the IQR. The lines only serve as guide to the eye. | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S1.** Results of the comparative algorithm on single IV curve | | | | | | | | | | |
|  |  | Parameter | | | | | | | | |
|  |  | *I*01 (A) | *n*1 | *R*p1 (Ω) | *I*02 (A) | *n*2 | *R*p2 (Ω) | *R*s (Ω) | *I*ph (A) | RMSPE |
|  | true value | 1.6e-9 | 1.92 | 190 | 1.6e-4 | 1.92 | 190 | 45 | 8e-3 |  |
| DE | MEAN | 4.30612E-7 | 2.29342 | 273.866 | 8.17387E-4 | 8.08356 | 217.375 | 23.6714 | 0.00793327 | 0.202896 |
| MEDIAN | 6.31239E-9 | 2.09479 | 200.493 | 3.843E-4 | 4.91355 | 106.342 | 14.1994 | 0.00776123 | 0.177838 |
| STD | 9.79424E-7 | 0.819543 | 327.208 | 0.00101283 | 8.7304 | 448.313 | 22.4509 | 8.7897E-4 | 0.0818108 |
| IQR | 2.47897E-7 | 1.18701 | 73.9815 | 0.00118424 | 6.42196 | 73.1935 | 36.6225 | 0.00105832 | 0.12722 |
| EBLSHADE | MEAN | 4.89016E-8 | 1.99143 | 191.859 | 1.90839E-4 | 2.09441 | 257.032 | 42.8834 | 0.00795469 | 0.112344 |
| MEDIAN | 1.59673E-9 | 1.91973 | 189.998 | 1.59904E-4 | 1.91936 | 189.951 | 45.0092 | 0.00800011 | 0.111803 |
| STD | 2.94351E-7 | 0.302862 | 7.06297 | 1.42778E-4 | 0.749826 | 408.471 | 8.42013 | 1.76013E-4 | 0.00378624 |
| IQR | 2.45E-17 | 2E-9 | 1E-7 | 4E-13 | 2.5E-9 | 2.5E-7 | 5E-8 | 2E-12 | 0 |
| ADELI | MEAN | 1.59673E-9 | 1.91973 | 189.998 | 1.59904E-4 | 1.91936 | 189.951 | 45.0092 | 0.00800011 | 0.111803 |
| MEDIAN | 1.59673E-9 | 1.91973 | 189.998 | 1.59904E-4 | 1.91936 | 189.951 | 45.0092 | 0.00800011 | 0.111803 |
| STD | 2.24774E-17 | 1.8407E-9 | 8.14411E-8 | 2.26085E-12 | 1.09586E-8 | 1.29649E-6 | 8.3637E-8 | 1.67527E-12 | 5.60747E-17 |
| IQR | 2.5E-17 | 2E-9 | 1E-7 | 8E-13 | 6E-9 | 3.5E-7 | 6.5E-8 | 2E-12 | 0 |
| NDE | MEAN | 2.96195E-7 | 2.42087 | 217.047 | 4.32932E-4 | 4.1948 | 572.088 | 31.1402 | 0.00768983 | 0.150002 |
| MEDIAN | 1.97951E-8 | 2.31401 | 205.507 | 2.7074E-4 | 2.82514 | 247.163 | 33.9332 | 0.00765711 | 0.111897 |
| STD | 1.06531E-6 | 0.585381 | 81.8273 | 3.94921E-4 | 6.46811 | 902.42 | 16.9948 | 3.9184E-4 | 0.149461 |
| IQR | 1.28566E-7 | 0.782389 | 32.2484 | 5.10535E-4 | 2.85309 | 341.063 | 30.0524 | 6.3894E-4 | 2.59792E-4 |
| MABC | MEAN | 1.87007E-6 | 3.23398 | 517.263 | 0.00116959 | 14.9942 | 881.309 | 25.5168 | 0.0101761 | 0.404887 |
| MEDIAN | 3.78613E-8 | 3.00104 | 141.578 | 2.22821E-4 | 6.65565 | 82.0348 | 12.4381 | 0.00855776 | 0.169928 |
| STD | 3.35158E-6 | 3.38085 | 2492.2 | 0.00255612 | 17.4695 | 2269.68 | 27.1128 | 0.00447919 | 0.313895 |
| IQR | 1.56208E-6 | 2.81682 | 158.743 | 7.57854E-4 | 23.8231 | 151.829 | 47.2398 | 0.00357495 | 0.608581 |
| TLBO | MEAN | 4.76305E-9 | 1.91592 | 189.79 | 2.17925E-4 | 2.14102 | 494.417 | 44.2879 | 0.00801613 | 0.111834 |
| MEDIAN | 1.59673E-9 | 1.91973 | 189.998 | 1.59904E-4 | 1.91936 | 189.951 | 45.0092 | 0.00800011 | 0.111803 |
| STD | 1.1263E-8 | 0.237052 | 9.96477 | 2.26679E-4 | 1.05125 | 1239.57 | 9.34268 | 2.38013E-4 | 9.91547E-5 |
| IQR | 3.78381E-11 | 0.00312336 | 0.131118 | 2.10985E-8 | 0.00210025 | 0.0325284 | 0.0313024 | 1.92458E-6 | 2.0801E-6 |
| **Table S1** (*continued*) | | | | | | | | | | |
|  |  | *I*01 (A) | *n*1 | *R*p1 (Ω) | *I*02 (A) | *n*2 | *R*p2 (Ω) | *R*s (Ω) | *I*ph (A) | RMSPE |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | true value | 1.6e-9 | 1.92 | 190 | 1.6e-4 | 1.92 | 190 | 45 | 8e-3 |  |
| GOTLBO | MEAN | 1.71767E-6 | 9.57122 | 11628.3 | 7.92397E-4 | 20.2703 | 128.312 | 24.659 | 0.0228366 | 0.639726 |
| MEDIAN | 1.03447E-8 | 3.41832 | 69.094 | 7.71914E-7 | 14.2566 | 74.3327 | 8.80183 | 0.0142995 | 0.81521 |
| STD | 3.34406E-6 | 11.018 | 44234.6 | 0.00216328 | 14.115 | 417.298 | 29.8185 | 0.0197114 | 0.282839 |
| IQR | 1.36228E-6 | 15.8671 | 216.793 | 2.4192E-4 | 23.5098 | 64.4833 | 43.6466 | 0.0237021 | 0.493468 |
| STLBO | MEAN | 1.59673E-9 | 1.91973 | 189.998 | 1.59904E-4 | 1.91936 | 189.951 | 45.0092 | 0.00800011 | 0.111803 |
| MEDIAN | 1.59673E-9 | 1.91973 | 189.998 | 1.59904E-4 | 1.91936 | 189.951 | 45.0092 | 0.00800011 | 0.111803 |
| STD | 3.10035E-17 | 2.53498E-9 | 1.09935E-7 | 7.54905E-13 | 5.08363E-9 | 3.95897E-7 | 7.27714E-8 | 2.265E-12 | 5.60747E-17 |
| IQR | 3.6E-17 | 2.5E-9 | 1E-7 | 1.15E-12 | 7.5E-9 | 6E-7 | 1E-7 | 3E-12 | 0 |
| PSO | MEAN | 3.14227E-6 | 16.6587 | 180118 | 0.00271538 | 36.2226 | 1271.15 | 41.1715 | 0.0386418 | 0.554837 |
| MEDIAN | 1E-16 | 3.52665 | 106.144 | 1E-10 | 50 | 22.0427 | 0.409733 | 0.00899564 | 0.836124 |
| STD | 4.55814E-6 | 22.0702 | 388032 | 0.00438738 | 21.3176 | 3258.81 | 45.3494 | 0.0350568 | 0.350233 |
| IQR | 1E-5 | 49.083 | 163.924 | 0.00643173 | 40.2401 | 100.011 | 92.3135 | 0.0667872 | 0.724107 |
| IJAYA | MEAN | 4.22388E-7 | 2.24164 | 311.312 | 6.00966E-4 | 6.98969 | 296.131 | 13.8104 | 0.00757605 | 0.137686 |
| MEDIAN | 9.73093E-9 | 2.19089 | 210.625 | 4.10043E-4 | 5.6748 | 159.549 | 3.75794 | 0.00761625 | 0.123026 |
| STD | 1.1024E-6 | 0.833675 | 469.522 | 9.60642E-4 | 5.94046 | 532.266 | 18.5512 | 6.09311E-4 | 0.0351445 |
| IQR | 1.12926E-7 | 1.11574 | 61.1361 | 5.19021E-4 | 3.36356 | 169.582 | 18.6422 | 8.92576E-4 | 0.0320204 |
| ISCA | MEAN | 1.15274E-6 | 10.4396 | 22799 | 5.06103E-4 | 15.9083 | 152.337 | 12.3251 | 0.0178729 | 0.740415 |
| MEDIAN | 2.08898E-8 | 3.5363 | 102.061 | 6.45362E-7 | 12.4266 | 76.6075 | 2.41391 | 0.0104324 | 0.830527 |
| STD | 2.29412E-6 | 12.3668 | 98896.9 | 0.00127207 | 11.5125 | 585.368 | 23.4796 | 0.0187227 | 0.239125 |
| IQR | 1.16327E-6 | 11.1835 | 413.555 | 9.58418E-5 | 16.2615 | 68.6495 | 7.87543 | 0.0101581 | 0.282537 |
| NNA | MEAN | 4.86072E-7 | 17.7241 | 7704.75 | 7.60416E-4 | 26.175 | 181.643 | 7.19023 | 0.0194113 | 0.776483 |
| MEDIAN | 4.09834E-12 | 13.7798 | 75.4677 | 6.53373E-6 | 24.3121 | 74.7187 | 1.47635 | 0.0127364 | 0.833512 |
| STD | 1.37597E-6 | 15.7707 | 23975 | 0.00178214 | 12.9398 | 643.998 | 14.9043 | 0.01764 | 0.233516 |
| IQR | 2.55487E-8 | 28.9827 | 126.308 | 4.49047E-4 | 21.3311 | 63.1188 | 3.89105 | 0.0132889 | 0.0740081 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Table S1** (*continued*) | | | | | | | | | | |
|  |  | *I*01 (A) | *n*1 | *R*p1 (Ω) | *I*02 (A) | *n*2 | *R*p2 (Ω) | *R*s (Ω) | *I*ph (A) | RMSPE |
|  | true value | 1.6e-9 | 1.92 | 190 | 1.6e-4 | 1.92 | 190 | 45 | 8e-3 |  |
| CWOA | MEAN | 1.91016E-6 | 19.7767 | 27364.9 | 0.00115056 | 30.3776 | 400.515 | 27.5457 | 0.026159 | 0.746787 |
| MEDIAN | 5.94422E-10 | 17.2753 | 56.5524 | 6.44204E-9 | 34.0434 | 52.5507 | 9.03927 | 0.0141445 | 0.854377 |
| STD | 3.8446E-6 | 17.5006 | 145161 | 0.00303351 | 17.6242 | 1479.81 | 32.8588 | 0.0257545 | 0.300868 |
| IQR | 5.44157E-7 | 30.0379 | 70.4671 | 9.36563E-5 | 32.9741 | 74.873 | 53.057 | 0.0233644 | 0.0649151 |
| WW | MEAN | 2.25657E-6 | 6.01898 | 1815.69 | 3.60402E-4 | 45.528 | 79.1659 | 16.1267 | 0.0242362 | 0.802633 |
| MEDIAN | 4.28549E-7 | 4.43733 | 94.2486 | 1E-10 | 50 | 31.019 | 1.15863 | 0.00961191 | 0.853405 |
| STD | 3.10815E-6 | 7.02418 | 7319.67 | 0.00147962 | 11.7448 | 227.327 | 25.8349 | 0.0246133 | 0.124962 |
| IQR | 3.2253E-6 | 3.28317 | 58.5468 | 5.44421E-5 | 0 | 61.1333 | 15.4329 | 0.0241842 | 0.0583219 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S2.** The statistical significance of the null hypothesis in Friedman, Friedman Aligned, and Quade tests and the Iman–Davenport extension | | | | | | | | | | | |
| Test | *p*-value | | | | | | | | | | |
| Single IV case | | | | | | | | | | IV-set case |
| *I*01 | *n*1 | *R*p1 | *I*02 | *n*2 | *R*p2 | *R*s | *I*ph | RMSPE | Comp |  |
| Friedman | 4.9664E-07 | 0.0000E+00 | 0.0000E+00 | 3.0381E-07 | 0.0000E+00 | 6.8597E-07 | 2.3210E-06 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 2.2964E-06 |
| Iman- Davenport | 0.0000E+00 | 1.4774E-09 | 1.4310E-09 | 0.0000E+00 | 1.3797E-09 | 0.0000E+00 | 1.5223E-09 | 1.4438E-09 | 1.2472E-09 | 0.0000E+00 | 0.0000E+00 |
| Friedman Aligned | 4.0411E-07 | 5.9524E-07 | 2.7010E-05 | 1.4847E-06 | 0.0000E+00 | 4.9647E-06 | 0.0000E+00 | 5.0555E-07 | 0.0000E+00 | 4.3982E-04 | 0.0000E+00 |
| Quade | 1.1191E-09 | 0.0000E+00 | 0.0000E+00 | 1.1432E-09 | 0.0000E+00 | 1.0869E-09 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 8.3247E-06 | 0.0000E+00 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S3.** Ranking of the algorithms according to Friedman, Friedman Aligned, and Quade tests. | | | | | | | | | | | | | | | |
| Test | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| ***Single-IV case*** | | | | | | | | | | | | | | | |
| *I*01 | | | | | | | | | | | | | | | |
| Friedman | 8.88 | 2.69 | **2.24** | 8.76 | 9.98 | 4.02 | 9.02 | 2.45 | 10.59 | 8.62 | 9.56 | 8.07 | 8.98 | 11.14 |
| Friedman Aligned | 6.695 | 5.448 | 5.210 | 6.149 | 8.248 | 5.261 | 8.254 | **5.209** | 9.168 | 6.618 | 7.847 | 6.668 | 7.814 | 9.552 |
| Quade | 8.332 | 2.921 | **2.091** | 8.318 | 9.632 | 4.337 | 9.587 | 2.568 | 11 | 8.464 | 9.183 | 8.156 | 9.323 | 11.09 |
| *n*1 | | | | | | | | | | | | | | | |
| Friedman | 7.16 | 2.61 | **2.22** | 6.42 | 9.32 | 3.53 | 9.66 | 2.4 | 10.99 | 7.18 | 9.98 | 11.1 | 11.67 | 10.76 |
| Friedman Aligned | 5.581 | 4.653 | **4.570** | 5.362 | 6.718 | 4.740 | 8.325 | **4.570** | 9.506 | 5.645 | 8.593 | 10.701 | 10.971 | 8.205 |
| Quade | 6.952 | 2.835 | **2.211** | 6.122 | 8.978 | 3.66 | 9.123 | 2.415 | 11.65 | 7.343 | 9.886 | 11.23 | 11.96 | 10.64 |
| *R*p1 | | | | | | | | | | | | | | | |
| Friedman | 7.3 | 2.37 | **2.26** | 6.24 | 8.46 | 3.51 | 11.36 | 2.34 | 11.2 | 7.22 | 10.98 | 10.94 | 10.84 | 9.98 |
| Friedman Aligned | 6.493 | 5.73 | **5.687** | 6.154 | 6.691 | 5.806 | 8.293 | **5.687** | 9.425 | 6.435 | 8.094 | 8.308 | 7.875 | 7.462 |
| Quade | 7.162 | 2.367 | 2.358 | 6.113 | 8.725 | 3.444 | 11.05 | **2.311** | 11.48 | 7.213 | 11.21 | 11.08 | 10.71 | 9.781 |
| *I*02 | | | | | | | | | | | | | | | |
| Friedman | 9.62 | 2.78 | **2.29** | 7.98 | 8.94 | 4.14 | 8.96 | 2.49 | 11.46 | 9.6 | 8.96 | 9.16 | 9.45 | 9.17 |
| Friedman Aligned | 8.649 | 5.008 | **4.807** | 6.892 | 8.111 | 5.275 | 7.530 | 4.808 | 9.699 | 7.469 | 7.632 | 7.663 | 7.958 | 6.640 |
| Quade | 9.531 | 2.999 | **2.227** | 8.038 | 8.985 | 4.273 | 8.831 | 2.375 | 11.78 | 9.843 | 8.599 | 8.987 | 9.276 | 9.257 |
| *n*2 | | | | | | | | | | | | | | | |
| Friedman | 7.6 | 2.41 | **2.31** | 5.64 | 8.1 | 3.66 | 9.74 | 2.46 | 11.44 | 7.68 | 9.1 | 10.72 | 10.97 | 13.17 |
| Friedman Aligned | 5.849 | 3.254 | **3.145** | 4.351 | 7.446 | 3.433 | 9.089 | **3.145** | 11.052 | 5.934 | 8.362 | 10.019 | 10.405 | 12.657 |
| Quade | 7.642 | 2.454 | **2.311** | 5.532 | 8.369 | 3.533 | 9.656 | 2.572 | 11.54 | 7.591 | 8.989 | 10.71 | 10.97 | 13.14 |
| *R*p2 | | | | | | | | | | | | | | | |
| Friedman | 7.12 | 2.72 | **2.28** | 8.16 | 10.16 | 4.21 | 9.49 | 2.55 | 11.03 | 7.44 | 9.14 | 9.78 | 10.58 | 10.34 |
| Friedman Aligned | 6.683 | 4.937 | **4.592** | 7.716 | 8.735 | 5.646 | 7.424 | 4.593 | 9.445 | 6.769 | 7.389 | 7.690 | 8.544 | 7.978 |
| Quade | 6.956 | 3.071 | **2.309** | 8.925 | 10.21 | 4.462 | 9.142 | 2.491 | 11.34 | 7.465 | 8.784 | 9.207 | 10.54 | 10.1 |
| *R*s | | | | | | | | | | | | | | | |
| Friedman | 7.8 | 2.5 | **2.31** | 6.28 | 8.68 | 3.75 | 9.34 | 2.38 | 12.62 | 9.22 | 10.1 | 10.38 | 9.62 | 10.02 |
| Friedman Aligned | 7.358 | 2.416 | **1.994** | 5.419 | 8.051 | 2.793 | 8.732 | 1.995 | 11.78 | 8.819 | 9.974 | 10.33 | 8.905 | 9.572 |
| Quade | 7.349 | 2.553 | **2.359** | 6.479 | 8.252 | 3.846 | 9.004 | 2.394 | 13.41 | 9.028 | 10.04 | 10.35 | 9.766 | 10.18 |
| *I*ph | | | | | | | | | | | | | | | |
| Friedman | 7.3 | 2.4 | **2.21** | 6.14 | 9.02 | 3.72 | 11.34 | 2.39 | 11.72 | 6.88 | 10.56 | 10.62 | 10.72 | 9.98 |
| Friedman Aligned | 5.405 | 4.803 | **4.765** | 5.112 | 6.609 | 4.848 | 9.646 | **4.765** | 10.50 | 5.322 | 8.428 | 9.055 | 9.944 | 8.934 |
| Quade | 7.083 | 2.399 | **2.293** | 6.202 | 8.682 | 3.905 | 11.09 | 2.331 | 12.19 | 6.56 | 10.54 | 10.61 | 11.13 | 9.974 |
| **Table S3** (*continued*) | | | | | | | | | | | | | | |
| Test | DE | EBLSHADE | ADELI | NDE | MABC | TLBO | GOTLBO | STLBO | PSO | IJAYA | ISCA | NNA | CWOA | WW |
| RMSPE | | | | | | | | | | | | | | | |
| Friedman | 7.92 | 2.51 | **2.28** | 5.03 | 8.56 | 3.26 | 10.7 | **2.28** | 9.74 | 6.66 | 11.32 | 11.38 | 11.5 | 11.86 |
| Friedman Aligned | 5.783 | 3.392 | **3.367** | 3.943 | 7.203 | 3.387 | 9.803 | **3.367** | 8.968 | 4.422 | 11.03 | 11.16 | 10.89 | 11.42 |
| Quade | 7.93 | 2.449 | **2.281** | 5.009 | 8.478 | 3.272 | 10.6 | **2.281** | 9.312 | 6.623 | 11.92 | 11.75 | 11.59 | 11.51 |
| Comp | | | | | | | | | | | | | | | |
| Friedman | 7.4 | **2** | 3.55 | 6.5 | 8.3 | 3.75 | 9.6 | 3.7 | 10.85 | 8.3 | 9.3 | 9.7 | 10.9 | 11.15 |
| Friedman Aligned | 7.23 | 4.165 | 5.305 | 5.36 | 7.84 | 5.295 | 7.58 | **4.045** | 8.685 | 7.34 | 7.05 | 9.15 | 9.59 | 10.06 |
| Quade | 7.945 | **2.409** | 4.364 | 7.073 | 8.945 | 4.355 | 8.745 | 3.782 | 10.31 | 8.891 | 8.964 | 8.673 | 9.636 | 10.91 |
| ***IV set case*** | | | | | | | | | | | | | | | |
| Friedman | 7.81 | 3.86 | **2.19** | 4.84 | 8.86 | 2.61 | 9.54 | 2.75 | 11.2 | 6.77 | 10.9 | 11.6 | 11.3 | 10.7 |
| Friedman Aligned | 6.181 | 4.583 | 4.379 | 4.722 | 7.154 | 4.378 | 8.004 | **4.226** | 10.50 | 5.850 | 9.774 | 9.278 | 9.743 | 9.302 |
| Quade | 8.056 | 3.931 | **2.336** | 4.956 | 8.895 | 2.71 | 9.135 | 2.812 | 11.88 | 6.855 | 10.63 | 11.11 | 11.42 | 10.27 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S4.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 8.61820E-02 | 8.98122E-02 | 8.98122E-02 | 8.61820E-02 |
| WW | Friedman Aligned | 2.30441E-08 | 7.09049E-08 | 7.09049E-08 | 7.09049E-08 |
| WW | Quade | 9.80292E-01 | 1.0 | 1.0 | 9.80292E-01 |
| PSO | Friedman | 2.38076E-01 | 4.91631E-01 | 4.91631E-01 | 3.94673E-01 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 9.80292E-01 | 1.0 | 1.0 | 9.80292E-01 |
| MABC | Friedman | 5.95703E-01 | 1.0 | 1.0 | 8.99625E-01 |
| MABC | Friedman Aligned | 6.53233E-12 | 1.32871E-11 | 1.32871E-11 | 1.32871E-11 |
| MABC | Quade | 9.80292E-01 | 1.0 | 1.0 | 9.99953E-01 |
| ISCA | Friedman | 8.26230E-01 | 1.0 | 1.0 | 9.95414E-01 |
| ISCA | Friedman Aligned | 3.32249E-07 | 1.15009E-06 | 1.15009E-06 | 1.15009E-06 |
| ISCA | Quade | 9.80292E-01 | 1.0 | 1.0 | 9.99970E-01 |
| GOTLBO | Friedman | 9.94739E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 6.53233E-12 | 1.20597E-11 | 1.20597E-11 | 1.20597E-11 |
| GOTLBO | Quade | 9.80292E-01 | 1.0 | 1.0 | 9.99953E-01 |
| CWOA | Friedman | 9.94739E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 6.22265E-07 | 2.29759E-06 | 2.29759E-06 | 2.29759E-06 |
| CWOA | Quade | 9.80292E-01 | 1.0 | 1.0 | 9.99970E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S4** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.97117E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S5.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 6.00409E-13 | 1.59650E-12 | 1.59650E-12 | 1.59650E-12 |
| DE | Friedman Aligned | 2.11188E-08 | 7.96017E-08 | 7.96017E-08 | 7.96017E-08 |
| DE | Quade | 4.39270E-02 | 1.66115E-01 | 1.30659E-01 | 1.54746E-01 |
| GOTLBO | Friedman | 6.00409E-13 | 6.00409E-13 | 6.00409E-13 | 6.00409E-13 |
| GOTLBO | Friedman Aligned | 1.14652E-08 | 3.96874E-08 | 3.70043E-08 | 3.96874E-08 |
| GOTLBO | Quade | 2.64966E-02 | 6.79570E-02 | 6.52926E-02 | 6.58962E-02 |
| ISCA | Friedman | 6.00409E-13 | 1.41664E-12 | 1.41664E-12 | 1.41664E-12 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.64966E-02 | 8.49735E-02 | 8.49735E-02 | 8.18808E-02 |
| CWOA | Friedman | 6.00409E-13 | 7.88702E-13 | 7.88702E-13 | 7.88702E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 2.64966E-02 | 8.09879E-02 | 8.09879E-02 | 7.81332E-02 |
| NDE | Friedman | 1.19158E-12 | 4.12470E-12 | 4.12470E-12 | 4.12470E-12 |
| NDE | Friedman Aligned | 1.71258E-03 | 5.27053E-03 | 5.27053E-03 | 5.26012E-03 |
| NDE | Quade | 4.39270E-02 | 1.66115E-01 | 1.30659E-01 | 1.54746E-01 |
| IJAYA | Friedman | 3.31860E-12 | 1.22533E-11 | 1.22533E-11 | 1.22533E-11 |
| IJAYA | Friedman Aligned | 1.17856E-07 | 4.07961E-07 | 4.07961E-07 | 4.07961E-07 |
| IJAYA | Quade | 4.36225E-02 | 1.66115E-01 | 1.30659E-01 | 1.54746E-01 |
| MABC | Friedman | 6.32573E-12 | 2.38431E-11 | 2.38431E-11 | 2.38431E-11 |
| MABC | Friedman Aligned | 1.14652E-08 | 3.96874E-08 | 3.70043E-08 | 3.96874E-08 |
| MABC | Quade | 2.64966E-02 | 6.79570E-02 | 6.52926E-02 | 6.58962E-02 |
| NNA | Friedman | 2.20572E-10 | 8.14419E-10 | 8.08514E-10 | 8.14419E-10 |
| NNA | Friedman Aligned | 3.72214E-08 | 1.37433E-07 | 1.37433E-07 | 1.37433E-07 |
| NNA | Quade | 4.39270E-02 | 1.66115E-01 | 1.30659E-01 | 1.54746E-01 |
| **Table S5** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 2.33571E-10 | 8.14419E-10 | 8.08514E-10 | 8.14419E-10 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 1.11341E-02 | 1.17606E-02 | 1.17606E-02 | 1.16974E-02 |
| WW | Friedman | 3.41671E-09 | 1.05129E-08 | 1.05129E-08 | 1.05129E-08 |
| WW | Friedman Aligned | 3.32036E-11 | 1.02165E-10 | 1.02165E-10 | 1.02165E-10 |
| WW | Quade | 1.11341E-02 | 1.11918E-02 | 1.11918E-02 | 1.11341E-02 |
| TLBO | Friedman | 1.30872E-01 | 3.35738E-01 | 3.35738E-01 | 2.99567E-01 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 6.24383E-01 | 1.0 | 1.0 | 9.16727E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S6.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Friedman Aligned | 4.81753E-11 | 1.66761E-10 | 1.66761E-10 | 1.66761E-10 |
| WW | Quade | 3.13831E-03 | 3.14287E-03 | 3.14287E-03 | 3.13831E-03 |
| DE | Friedman | <1E-13 | 2.10054E-13 | 2.10054E-13 | 2.10054E-13 |
| DE | Friedman Aligned | 3.56117E-11 | 1.09575E-10 | 1.09575E-10 | 1.09575E-10 |
| DE | Quade | 1.76412E-02 | 6.53596E-02 | 5.33566E-02 | 6.36053E-02 |
| NDE | Friedman | <1E-13 | 1.54543E-13 | 1.54543E-13 | 1.54543E-13 |
| NDE | Friedman Aligned | 2.17264E-05 | 6.68505E-05 | 6.68505E-05 | 6.68488E-05 |
| NDE | Quade | 1.76412E-02 | 6.53596E-02 | 5.33566E-02 | 6.36053E-02 |
| IJAYA | Friedman | <1E-13 | 3.04201E-13 | 3.04201E-13 | 3.04201E-13 |
| IJAYA | Friedman Aligned | 2.12767E-10 | 8.01968E-10 | 8.01968E-10 | 8.01968E-10 |
| IJAYA | Quade | 1.72505E-02 | 6.52823E-02 | 5.33566E-02 | 6.34840E-02 |
| CWOA | Friedman | 1.09690E-13 | 3.79696E-13 | 3.79696E-13 | 3.79696E-13 |
| CWOA | Friedman Aligned | 1.10735E-09 | 4.08867E-09 | 4.08867E-09 | 4.08867E-09 |
| CWOA | Quade | 9.04167E-03 | 2.85526E-02 | 2.85526E-02 | 2.81930E-02 |
| GOTLBO | Friedman | 1.28934E-13 | 4.76064E-13 | 4.76064E-13 | 4.76064E-13 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 9.04167E-03 | 2.30322E-02 | 2.22560E-02 | 2.27926E-02 |
| NNA | Friedman | 6.62388E-12 | 2.49669E-11 | 2.49669E-11 | 2.49669E-11 |
| NNA | Friedman Aligned | 5.41195E-11 | 1.99826E-10 | 1.99826E-10 | 1.99826E-10 |
| NNA | Quade | 1.76412E-02 | 6.53596E-02 | 5.33566E-02 | 6.36053E-02 |
| ISCA | Friedman | 6.84661E-12 | 2.52798E-11 | 2.52798E-11 | 2.52798E-11 |
| ISCA | Friedman Aligned | 1.38616E-09 | 4.79825E-09 | 4.79825E-09 | 4.79825E-09 |
| ISCA | Quade | 9.04167E-03 | 3.04966E-02 | 3.04966E-02 | 3.00928E-02 |
| **Table S6** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 9.26368E-11 | 3.20666E-10 | 3.20666E-10 | 3.20666E-10 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 9.04167E-03 | 2.30322E-02 | 2.22560E-02 | 2.27926E-02 |
| PSO | Friedman | 2.14340E-09 | 6.59507E-09 | 6.59507E-09 | 6.59507E-09 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 3.13831E-03 | 3.34101E-03 | 3.34101E-03 | 3.33590E-03 |
| TLBO | Friedman | 3.93259E-02 | 1.00134E-01 | 1.00134E-01 | 9.68289E-02 |
| TLBO | Friedman Aligned | 8.39430E-01 | 1.0 | 1.0 | 9.65839E-01 |
| TLBO | Quade | 4.09330E-01 | 1.0 | 8.45736E-01 | 7.37234E-01 |
| EBLSHADE | Friedman | 6.20041E-01 | 1.0 | 8.01816E-01 | 8.32456E-01 |
| EBLSHADE | Friedman Aligned | 3.15644E-01 | 8.23571E-01 | 8.23571E-01 | 6.18170E-01 |
| EBLSHADE | Quade | 7.62820E-01 | 1.0 | 8.45736E-01 | 9.29806E-01 |
| STLBO | Friedman | 8.01816E-01 | 1.0 | 8.01816E-01 | 8.32456E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 8.45736E-01 | 1.0 | 8.45736E-01 | 9.29806E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S7.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 5.62824E-02 | 5.77994E-02 | 5.77994E-02 | 5.62824E-02 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 9.79432E-01 | 1.0 | 1.0 | 9.79432E-01 |
| PSO | Friedman | 1.72572E-01 | 3.44675E-01 | 3.44675E-01 | 2.95116E-01 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 9.79432E-01 | 1.0 | 1.0 | 9.79432E-01 |
| MABC | Friedman | 4.92255E-01 | 1.0 | 1.0 | 8.21025E-01 |
| MABC | Friedman Aligned | 9.56302E-10 | 3.31028E-09 | 3.29539E-09 | 3.31028E-09 |
| MABC | Quade | 9.79432E-01 | 1.0 | 1.0 | 9.99948E-01 |
| ISCA | Friedman | 7.39566E-01 | 1.0 | 1.0 | 9.84073E-01 |
| ISCA | Friedman Aligned | <1E-13 | 1.46549E-13 | 1.46549E-13 | 1.46549E-13 |
| ISCA | Quade | 9.79432E-01 | 1.0 | 1.0 | 9.99966E-01 |
| GOTLBO | Friedman | 9.74456E-01 | 1.0 | 1.0 | 9.99997E-01 |
| GOTLBO | Friedman Aligned | 9.56302E-10 | 3.31028E-09 | 3.29539E-09 | 3.31028E-09 |
| GOTLBO | Quade | 9.79432E-01 | 1.0 | 1.0 | 9.99948E-01 |
| CWOA | Friedman | 9.74456E-01 | 1.0 | 1.0 | 9.99997E-01 |
| CWOA | Friedman Aligned | <1E-13 | 2.86438E-13 | 2.86438E-13 | 2.86438E-13 |
| CWOA | Quade | 9.79432E-01 | 1.0 | 1.0 | 9.99966E-01 |
| DE | Friedman | 9.82263E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 2.28343E-02 | 8.65263E-02 | 8.65263E-02 | 8.33830E-02 |
| DE | Quade | 9.99841E-01 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S7** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 4.50905E-02 | 1.57187E-01 | 1.57187E-01 | 1.47610E-01 |
| IJAYA | Quade | 9.96518E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 2.79302E-02 | 1.03688E-01 | 1.03688E-01 | 9.93104E-02 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S8.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 9.04976E-01 | 1.0 | 1.0 | 9.04976E-01 |
| WW | Friedman Aligned | 3.09282E-08 | 3.09282E-08 | 3.09282E-08 | 3.09282E-08 |
| WW | Quade | 9.99971E-01 | 1.0 | 1.0 | 9.99971E-01 |
| PSO | Friedman | 9.83045E-01 | 1.0 | 1.0 | 9.99462E-01 |
| PSO | Friedman Aligned | 1.62361E-04 | 2.99763E-04 | 2.99763E-04 | 2.99722E-04 |
| PSO | Quade | 9.99971E-01 | 1.0 | 1.0 | 9.99971E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S8** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S9.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.73195E-13 | 1.73195E-13 | 1.73195E-13 | 1.73195E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 7.37772E-02 | 7.87500E-02 | 7.87500E-02 | 7.59689E-02 |
| MABC | Friedman | 6.30140E-12 | 1.30429E-11 | 1.30429E-11 | 1.30429E-11 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 1.26592E-01 | 3.38277E-01 | 3.21918E-01 | 2.90779E-01 |
| WW | Friedman | 6.30140E-12 | 1.16334E-11 | 1.16334E-11 | 1.16334E-11 |
| WW | Friedman Aligned | 5.34616E-11 | 1.64497E-10 | 1.64497E-10 | 1.64497E-10 |
| WW | Quade | 7.37772E-02 | 7.64150E-02 | 7.64150E-02 | 7.37772E-02 |
| ISCA | Friedman | 1.24759E-10 | 3.83875E-10 | 3.83875E-10 | 3.83875E-10 |
| ISCA | Friedman Aligned | 8.36943E-10 | 3.09025E-09 | 2.80188E-09 | 3.09025E-09 |
| ISCA | Quade | 1.26592E-01 | 3.84352E-01 | 3.84352E-01 | 3.25573E-01 |
| GOTLBO | Friedman | 6.17865E-09 | 2.13876E-08 | 2.13876E-08 | 2.13876E-08 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.26592E-01 | 3.38277E-01 | 3.21918E-01 | 2.90779E-01 |
| CWOA | Friedman | 6.88175E-09 | 2.54096E-08 | 2.54096E-08 | 2.54096E-08 |
| CWOA | Friedman Aligned | 7.23793E-10 | 2.72814E-09 | 2.72814E-09 | 2.72814E-09 |
| CWOA | Quade | 1.26592E-01 | 3.77401E-01 | 3.77401E-01 | 3.19919E-01 |
| DE | Friedman | 1.20683E-08 | 4.54881E-08 | 4.54881E-08 | 4.54881E-08 |
| DE | Friedman Aligned | 1.38245E-10 | 4.78541E-10 | 4.78541E-10 | 4.78541E-10 |
| DE | Quade | 1.64554E-01 | 6.45899E-01 | 4.76691E-01 | 4.92200E-01 |
| NDE | Friedman | 2.44925E-08 | 9.04338E-08 | 9.04338E-08 | 9.04338E-08 |
| NDE | Friedman Aligned | 6.08400E-05 | 1.87201E-04 | 1.87201E-04 | 1.87188E-04 |
| NDE | Quade | 1.64554E-01 | 6.45899E-01 | 4.76691E-01 | 4.92200E-01 |
| **Table S9** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 5.66935E-08 | 1.96247E-07 | 1.96247E-07 | 1.96247E-07 |
| IJAYA | Friedman Aligned | 8.36943E-10 | 3.09025E-09 | 2.80188E-09 | 3.09025E-09 |
| IJAYA | Quade | 1.64554E-01 | 6.45899E-01 | 4.76691E-01 | 4.92200E-01 |
| NNA | Friedman | 1.68226E-06 | 5.17618E-06 | 5.17618E-06 | 5.17617E-06 |
| NNA | Friedman Aligned | 2.55778E-10 | 9.44411E-10 | 9.44411E-10 | 9.44411E-10 |
| NNA | Quade | 1.64554E-01 | 6.45899E-01 | 4.76691E-01 | 4.92200E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 4.42830E-01 | 1.0 | 1.0 | 7.73432E-01 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S10.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.37121E-01 | 1.46648E-01 | 1.46648E-01 | 1.37121E-01 |
| WW | Friedman Aligned | 3.61499E-08 | 3.61499E-08 | 3.61499E-08 | 3.61499E-08 |
| WW | Quade | 9.99959E-01 | 1.0 | 1.0 | 9.99959E-01 |
| PSO | Friedman | 3.33849E-01 | 7.27025E-01 | 7.27025E-01 | 5.27624E-01 |
| PSO | Friedman Aligned | 1.81858E-04 | 3.35764E-04 | 3.35764E-04 | 3.35712E-04 |
| PSO | Quade | 9.99959E-01 | 1.0 | 1.0 | 9.99959E-01 |
| MABC | Friedman | 7.14527E-01 | 1.0 | 1.0 | 9.58507E-01 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 9.07106E-01 | 1.0 | 1.0 | 9.99332E-01 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S10** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S11.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.67422E-13 | 2.22267E-13 | 2.22267E-13 | 2.22267E-13 |
| DE | Friedman Aligned | 3.49457E-11 | 1.07525E-10 | 1.07525E-10 | 1.07525E-10 |
| DE | Quade | 3.02027E-02 | 1.13113E-01 | 9.04256E-02 | 1.07775E-01 |
| GOTLBO | Friedman | 1.67422E-13 | 1.67422E-13 | 1.59872E-13 | 1.67422E-13 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.70097E-02 | 4.34638E-02 | 4.18609E-02 | 4.26152E-02 |
| CWOA | Friedman | 1.67422E-13 | 1.67422E-13 | 1.59872E-13 | 1.67422E-13 |
| CWOA | Friedman Aligned | 1.11444E-09 | 4.11484E-09 | 4.11484E-09 | 4.11484E-09 |
| CWOA | Quade | 1.70097E-02 | 5.26703E-02 | 5.26703E-02 | 5.14540E-02 |
| NDE | Friedman | 1.78968E-13 | 5.50671E-13 | 5.50671E-13 | 5.50671E-13 |
| NDE | Friedman Aligned | 2.14581E-05 | 6.60250E-05 | 6.60250E-05 | 6.60233E-05 |
| NDE | Quade | 3.02027E-02 | 1.13113E-01 | 9.04256E-02 | 1.07775E-01 |
| IJAYA | Friedman | 4.96492E-13 | 1.71863E-12 | 1.71863E-12 | 1.71863E-12 |
| IJAYA | Friedman Aligned | 2.08974E-10 | 7.87669E-10 | 7.87669E-10 | 7.87669E-10 |
| IJAYA | Quade | 2.98017E-02 | 1.13113E-01 | 9.04256E-02 | 1.07775E-01 |
| ISCA | Friedman | 1.94555E-12 | 7.18359E-12 | 7.18359E-12 | 7.18359E-12 |
| ISCA | Friedman Aligned | 1.39470E-09 | 4.82782E-09 | 4.82782E-09 | 4.82782E-09 |
| ISCA | Quade | 1.70097E-02 | 5.56810E-02 | 5.56810E-02 | 5.43433E-02 |
| MABC | Friedman | 3.23165E-11 | 1.21808E-10 | 1.20929E-10 | 1.21808E-10 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 1.70097E-02 | 4.34638E-02 | 4.18609E-02 | 4.26152E-02 |
| NNA | Friedman | 3.27515E-11 | 1.21808E-10 | 1.20929E-10 | 1.21808E-10 |
| NNA | Friedman Aligned | 5.31237E-11 | 1.96149E-10 | 1.96149E-10 | 1.96149E-10 |
| NNA | Quade | 3.02027E-02 | 1.13113E-01 | 9.04256E-02 | 1.07775E-01 |
| **Table S11** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 8.45375E-10 | 2.92630E-09 | 2.92630E-09 | 2.92630E-09 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 6.58951E-03 | 6.97972E-03 | 6.97972E-03 | 6.95743E-03 |
| WW | Friedman | 9.80423E-09 | 3.01669E-08 | 3.01669E-08 | 3.01669E-08 |
| WW | Friedman Aligned | 4.82405E-11 | 1.66986E-10 | 1.66986E-10 | 1.66986E-10 |
| WW | Quade | 6.58951E-03 | 6.60964E-03 | 6.60964E-03 | 6.58951E-03 |
| TLBO | Friedman | 7.11999E-02 | 1.81756E-01 | 1.81756E-01 | 1.70967E-01 |
| TLBO | Friedman Aligned | 8.37421E-01 | 1.0 | 9.97806E-01 | 9.65045E-01 |
| TLBO | Quade | 5.28241E-01 | 1.0 | 1.0 | 8.51492E-01 |
| EBLSHADE | Friedman | 8.00557E-01 | 1.0 | 1.0 | 9.49025E-01 |
| EBLSHADE | Friedman Aligned | 3.14299E-01 | 8.19952E-01 | 8.19952E-01 | 6.16263E-01 |
| EBLSHADE | Quade | 9.04532E-01 | 1.0 | 1.0 | 9.86919E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 9.97806E-01 | 1.0 | 9.97806E-01 | 9.97806E-01 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S12.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 9.99908E-01 | 1.0 | 1.0 | 9.99908E-01 |
| WW | Friedman Aligned | 6.53248E-01 | 1.0 | 1.0 | 6.53248E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S12** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S13.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 3.32214E-02 | 3.37419E-02 | 3.37419E-02 | 3.32214E-02 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 9.87045E-01 | 1.0 | 1.0 | 9.87045E-01 |
| PSO | Friedman | 1.14549E-01 | 2.22512E-01 | 2.22512E-01 | 2.01165E-01 |
| PSO | Friedman Aligned | 1.21060E-09 | 3.72493E-09 | 3.72493E-09 | 3.72493E-09 |
| PSO | Quade | 9.87045E-01 | 1.0 | 1.0 | 9.87045E-01 |
| MABC | Friedman | 3.78814E-01 | 1.0 | 1.0 | 7.01392E-01 |
| MABC | Friedman Aligned | 5.00822E-13 | 1.02585E-12 | 1.02585E-12 | 1.02585E-12 |
| MABC | Quade | 9.87097E-01 | 1.0 | 1.0 | 9.99984E-01 |
| ISCA | Friedman | 6.26168E-01 | 1.0 | 1.0 | 9.51565E-01 |
| ISCA | Friedman Aligned | 4.74790E-08 | 1.64351E-07 | 1.64351E-07 | 1.64351E-07 |
| ISCA | Quade | 9.87097E-01 | 1.0 | 1.0 | 9.99992E-01 |
| GOTLBO | Friedman | 9.25970E-01 | 1.0 | 1.0 | 9.99878E-01 |
| GOTLBO | Friedman Aligned | 5.00822E-13 | 9.24594E-13 | 9.24594E-13 | 9.24594E-13 |
| GOTLBO | Quade | 9.87097E-01 | 1.0 | 1.0 | 9.99984E-01 |
| CWOA | Friedman | 9.25970E-01 | 1.0 | 1.0 | 9.99878E-01 |
| CWOA | Friedman Aligned | 9.31630E-08 | 3.43987E-07 | 3.43987E-07 | 3.43987E-07 |
| CWOA | Quade | 9.87097E-01 | 1.0 | 1.0 | 9.99991E-01 |
| DE | Friedman | 9.27163E-01 | 1.0 | 1.0 | 9.99948E-01 |
| DE | Friedman Aligned | 9.09797E-01 | 1.0 | 1.0 | 9.99885E-01 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 9.62357E-01 | 1.0 | 1.0 | 9.99994E-01 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S13** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 9.37660E-01 | 1.0 | 1.0 | 9.99965E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S14.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 5.46183E-01 | 7.66533E-01 | 7.66533E-01 | 5.46183E-01 |
| WW | Friedman Aligned | 1.67422E-13 | 1.67422E-13 | 1.67422E-13 | 1.67422E-13 |
| WW | Quade | 9.99427E-01 | 1.0 | 1.0 | 9.99427E-01 |
| PSO | Friedman | 7.98259E-01 | 1.0 | 1.0 | 9.47935E-01 |
| PSO | Friedman Aligned | 9.59407E-09 | 1.77121E-08 | 1.77121E-08 | 1.77121E-08 |
| PSO | Quade | 9.99427E-01 | 1.0 | 1.0 | 9.99427E-01 |
| MABC | Friedman | 9.84137E-01 | 1.0 | 1.0 | 9.99973E-01 |
| MABC | Friedman Aligned | 2.43064E-01 | 6.84667E-01 | 6.59303E-01 | 5.06830E-01 |
| MABC | Quade | 9.99765E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S14** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 2.43064E-01 | 6.84667E-01 | 6.59303E-01 | 5.06830E-01 |
| GOTLBO | Quade | 9.99765E-01 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 9.99765E-01 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S15.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 3.15655E-03 | 3.16116E-03 | 3.16116E-03 | 3.15655E-03 |
| WW | Friedman Aligned | 2.84215E-08 | 8.74507E-08 | 8.74507E-08 | 8.74507E-08 |
| WW | Quade | 9.67443E-01 | 1.0 | 1.0 | 9.67443E-01 |
| PSO | Friedman | 1.67510E-02 | 3.11464E-02 | 3.11464E-02 | 3.07056E-02 |
| PSO | Friedman Aligned | 9.00108E-10 | 2.28489E-09 | 2.28489E-09 | 2.28489E-09 |
| PSO | Quade | 9.67443E-01 | 1.0 | 1.0 | 9.67443E-01 |
| MABC | Friedman | 9.36544E-02 | 2.46808E-01 | 2.46808E-01 | 2.20902E-01 |
| MABC | Friedman Aligned | 5.44120E-12 | 6.05649E-12 | 6.05649E-12 | 6.05649E-12 |
| MABC | Quade | 9.67711E-01 | 1.0 | 1.0 | 9.99836E-01 |
| ISCA | Friedman | 2.23633E-01 | 7.49303E-01 | 7.49303E-01 | 5.41072E-01 |
| ISCA | Friedman Aligned | 1.70405E-07 | 5.89862E-07 | 5.89862E-07 | 5.89862E-07 |
| ISCA | Quade | 9.67711E-01 | 1.0 | 1.0 | 9.99883E-01 |
| DE | Friedman | 5.36748E-01 | 1.0 | 1.0 | 9.41253E-01 |
| DE | Friedman Aligned | 9.87042E-01 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 9.90483E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 5.36748E-01 | 1.0 | 1.0 | 9.30303E-01 |
| GOTLBO | Friedman Aligned | 5.44120E-12 | 5.44120E-12 | 5.44120E-12 | 5.44120E-12 |
| GOTLBO | Quade | 9.67711E-01 | 1.0 | 1.0 | 9.99836E-01 |
| CWOA | Friedman | 5.36748E-01 | 1.0 | 1.0 | 9.30303E-01 |
| CWOA | Friedman Aligned | 3.24827E-07 | 1.19936E-06 | 1.19936E-06 | 1.19936E-06 |
| CWOA | Quade | 9.67711E-01 | 1.0 | 1.0 | 9.99883E-01 |
| NDE | Friedman | 5.75197E-01 | 1.0 | 1.0 | 9.57621E-01 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 9.90483E-01 | 1.0 | 1.0 | 1.0 |
| **Table S15** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 6.44122E-01 | 1.0 | 1.0 | 9.72022E-01 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.86183E-01 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S16.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.20537E-01 | 1.27812E-01 | 1.27812E-01 | 1.20537E-01 |
| WW | Friedman Aligned | 2.91545E-13 | 2.91545E-13 | 2.91545E-13 | 2.91545E-13 |
| WW | Quade | 9.99748E-01 | 1.0 | 1.0 | 9.99748E-01 |
| PSO | Friedman | 3.04410E-01 | 6.51777E-01 | 6.51777E-01 | 4.88366E-01 |
| PSO | Friedman Aligned | 3.75852E-09 | 6.93880E-09 | 6.93880E-09 | 6.93880E-09 |
| PSO | Quade | 9.99748E-01 | 1.0 | 1.0 | 9.99748E-01 |
| MABC | Friedman | 6.81406E-01 | 1.0 | 1.0 | 9.45174E-01 |
| MABC | Friedman Aligned | 1.76838E-01 | 4.83063E-01 | 4.66752E-01 | 3.89813E-01 |
| MABC | Quade | 9.99953E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 8.86583E-01 | 1.0 | 1.0 | 9.98766E-01 |
| ISCA | Friedman Aligned | 9.96008E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 9.99795E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.76838E-01 | 4.83063E-01 | 4.66752E-01 | 3.89813E-01 |
| GOTLBO | Quade | 9.99953E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S16** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S17.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *I*01 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S17** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S18.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 9.13669E-07 | 9.13669E-07 | 9.13669E-07 | 9.13669E-07 |
| CWOA | Friedman Aligned | 3.17443E-10 | 9.76748E-10 | 9.76748E-10 | 9.76748E-10 |
| CWOA | Quade | 4.21326E-01 | 5.35667E-01 | 5.35667E-01 | 4.21326E-01 |
| NNA | Friedman | 1.61653E-05 | 2.98438E-05 | 2.98438E-05 | 2.98434E-05 |
| NNA | Friedman Aligned | 3.15806E-10 | 8.01662E-10 | 8.01662E-10 | 8.01662E-10 |
| NNA | Quade | 4.21326E-01 | 8.89041E-01 | 8.89041E-01 | 6.04273E-01 |
| PSO | Friedman | 2.03695E-05 | 5.17077E-05 | 5.17077E-05 | 5.17065E-05 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 4.21326E-01 | 6.62888E-01 | 6.62888E-01 | 4.94345E-01 |
| WW | Friedman | 5.48061E-05 | 1.68637E-04 | 1.68637E-04 | 1.68625E-04 |
| WW | Friedman Aligned | 2.17279E-09 | 7.52120E-09 | 7.52120E-09 | 7.52120E-09 |
| WW | Quade | 4.21326E-01 | 1.0 | 1.0 | 7.59069E-01 |
| ISCA | Friedman | 1.94934E-03 | 6.75178E-03 | 6.75178E-03 | 6.73155E-03 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 4.95300E-01 | 1.0 | 1.0 | 9.06235E-01 |
| GOTLBO | Friedman | 6.07282E-03 | 2.24595E-02 | 2.24595E-02 | 2.22401E-02 |
| GOTLBO | Friedman Aligned | 5.81901E-09 | 2.14856E-08 | 2.14856E-08 | 2.14856E-08 |
| GOTLBO | Quade | 6.39735E-01 | 1.0 | 1.0 | 9.76937E-01 |
| MABC | Friedman | 1.81819E-02 | 6.88217E-02 | 6.88217E-02 | 6.68248E-02 |
| MABC | Friedman Aligned | 3.53249E-07 | 1.33148E-06 | 1.33148E-06 | 1.33148E-06 |
| MABC | Quade | 6.39735E-01 | 1.0 | 1.0 | 9.76937E-01 |
| IJAYA | Friedman | 9.98394E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 9.08636E-01 | 1.0 | 1.0 | 9.99854E-01 |
| IJAYA | Quade | 9.65203E-01 | 1.0 | 1.0 | 9.99996E-01 |
| **Table S18** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S19.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 2.57175E-03 | 2.57480E-03 | 2.57480E-03 | 2.57175E-03 |
| MABC | Friedman | 2.13607E-13 | 3.94351E-13 | 3.94351E-13 | 3.94351E-13 |
| MABC | Friedman Aligned | 3.33763E-10 | 1.25803E-09 | 1.25803E-09 | 1.25803E-09 |
| MABC | Quade | 2.25210E-02 | 8.53328E-02 | 8.53328E-02 | 8.22748E-02 |
| GOTLBO | Friedman | 2.44012E-12 | 6.19416E-12 | 6.19416E-12 | 6.19416E-12 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 2.21704E-02 | 8.23542E-02 | 8.23542E-02 | 7.94473E-02 |
| ISCA | Friedman | 1.94065E-11 | 5.97122E-11 | 5.97122E-11 | 5.97122E-11 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 1.04000E-02 | 3.61159E-02 | 3.61159E-02 | 3.55416E-02 |
| WW | Friedman | 1.60152E-09 | 5.54373E-09 | 5.54373E-09 | 5.54373E-09 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 4.71779E-03 | 1.45400E-02 | 1.45400E-02 | 1.44453E-02 |
| PSO | Friedman | 4.11590E-09 | 1.51972E-08 | 1.51972E-08 | 1.51972E-08 |
| PSO | Friedman Aligned | 1.29144E-10 | 4.47038E-10 | 4.47038E-10 | 4.47038E-10 |
| PSO | Quade | 2.57175E-03 | 3.86298E-03 | 3.86298E-03 | 3.85615E-03 |
| NNA | Friedman | 5.85484E-09 | 2.20682E-08 | 2.20682E-08 | 2.20682E-08 |
| NNA | Friedman Aligned | 1.73241E-10 | 6.39659E-10 | 6.39659E-10 | 6.39659E-10 |
| NNA | Quade | 2.65209E-03 | 6.73911E-03 | 6.73911E-03 | 6.71851E-03 |
| IJAYA | Friedman | 7.80303E-08 | 2.88112E-07 | 2.74456E-07 | 2.88112E-07 |
| IJAYA | Friedman Aligned | 8.81170E-06 | 3.25356E-05 | 3.25356E-05 | 3.25351E-05 |
| IJAYA | Quade | 1.04801E-01 | 3.95158E-01 | 3.95158E-01 | 3.35534E-01 |
| **Table S19** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 7.92873E-08 | 2.88112E-07 | 2.74456E-07 | 2.88112E-07 |
| DE | Friedman Aligned | 3.00304E-05 | 1.03952E-04 | 1.03952E-04 | 1.03948E-04 |
| DE | Quade | 1.31444E-01 | 4.64771E-01 | 4.64771E-01 | 3.86031E-01 |
| NDE | Friedman | 6.84857E-06 | 2.10725E-05 | 2.10725E-05 | 2.10724E-05 |
| NDE | Friedman Aligned | 1.50161E-03 | 4.62113E-03 | 4.62113E-03 | 4.61313E-03 |
| NDE | Quade | 2.27244E-01 | 7.19509E-01 | 7.19509E-01 | 5.47608E-01 |
| TLBO | Friedman | 3.12274E-01 | 8.14506E-01 | 8.14506E-01 | 6.13379E-01 |
| TLBO | Friedman Aligned | 7.47586E-01 | 1.0 | 1.0 | 9.69641E-01 |
| TLBO | Quade | 7.92910E-01 | 1.0 | 1.0 | 9.81630E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S20.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | 1.41434E-10 | 4.89580E-10 | 4.51671E-10 | 4.89580E-10 |
| PSO | Quade | 9.10568E-04 | 1.40843E-03 | 1.40843E-03 | 1.40752E-03 |
| NNA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Friedman Aligned | 1.41434E-10 | 4.89580E-10 | 4.51671E-10 | 4.89580E-10 |
| NNA | Quade | 1.00825E-03 | 2.56039E-03 | 2.56039E-03 | 2.55742E-03 |
| CWOA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 9.10568E-04 | 9.10951E-04 | 9.10951E-04 | 9.10568E-04 |
| MABC | Friedman | 2.70184E-12 | 8.31335E-12 | 8.31335E-12 | 8.31335E-12 |
| MABC | Friedman Aligned | 1.75948E-09 | 6.63187E-09 | 6.63187E-09 | 6.63187E-09 |
| MABC | Quade | 1.06705E-02 | 4.03192E-02 | 4.03192E-02 | 3.96291E-02 |
| GOTLBO | Friedman | 2.50012E-11 | 8.65428E-11 | 8.65428E-11 | 8.65428E-11 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.03648E-02 | 3.83774E-02 | 3.83774E-02 | 3.77392E-02 |
| ISCA | Friedman | 1.56474E-10 | 5.77749E-10 | 5.77749E-10 | 5.77749E-10 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 4.51230E-03 | 1.56412E-02 | 1.56412E-02 | 1.55329E-02 |
| IJAYA | Friedman | 5.89865E-09 | 2.22334E-08 | 1.97169E-08 | 2.22334E-08 |
| IJAYA | Friedman Aligned | 1.36159E-06 | 5.02741E-06 | 5.02741E-06 | 5.02740E-06 |
| IJAYA | Quade | 5.82602E-02 | 2.17592E-01 | 2.17592E-01 | 1.98793E-01 |
| DE | Friedman | 5.96217E-09 | 2.22334E-08 | 1.97169E-08 | 2.22334E-08 |
| DE | Friedman Aligned | 5.16020E-06 | 1.78623E-05 | 1.78623E-05 | 1.78621E-05 |
| DE | Quade | 7.57041E-02 | 2.65210E-01 | 2.65210E-01 | 2.38529E-01 |
| **Table S20** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 5.96217E-09 | 2.22334E-08 | 1.97169E-08 | 2.22334E-08 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 1.90142E-03 | 5.85437E-03 | 5.85437E-03 | 5.83897E-03 |
| NDE | Friedman | 6.71920E-07 | 2.06745E-06 | 2.06745E-06 | 2.06745E-06 |
| NDE | Friedman Aligned | 3.70876E-04 | 1.14121E-03 | 1.14121E-03 | 1.14072E-03 |
| NDE | Quade | 1.41276E-01 | 4.42227E-01 | 4.42227E-01 | 3.74146E-01 |
| TLBO | Friedman | 1.37223E-01 | 3.52222E-01 | 3.52222E-01 | 3.12487E-01 |
| TLBO | Friedman Aligned | 4.91056E-01 | 1.0 | 1.0 | 8.19950E-01 |
| TLBO | Quade | 6.15068E-01 | 1.0 | 9.33437E-01 | 9.11384E-01 |
| EBLSHADE | Friedman | 6.70491E-01 | 1.0 | 8.29657E-01 | 8.71202E-01 |
| EBLSHADE | Friedman Aligned | 7.33523E-01 | 1.0 | 1.0 | 9.12968E-01 |
| EBLSHADE | Quade | 8.24213E-01 | 1.0 | 9.33437E-01 | 9.59624E-01 |
| STLBO | Friedman | 8.29657E-01 | 1.0 | 8.29657E-01 | 8.71202E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 9.33437E-01 | 1.0 | 9.33437E-01 | 9.59624E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S21.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 4.80155E-09 | 4.80155E-09 | 4.80155E-09 | 4.80155E-09 |
| CWOA | Friedman Aligned | 3.03064E-10 | 1.01341E-09 | 1.01341E-09 | 1.01341E-09 |
| CWOA | Quade | 2.02938E-01 | 2.24855E-01 | 2.24855E-01 | 2.02938E-01 |
| NNA | Friedman | 1.48126E-07 | 2.73464E-07 | 2.73464E-07 | 2.73464E-07 |
| NNA | Friedman Aligned | 3.03064E-10 | 9.32505E-10 | 9.32505E-10 | 9.32505E-10 |
| NNA | Quade | 2.02938E-01 | 4.07942E-01 | 4.07942E-01 | 3.40121E-01 |
| PSO | Friedman | 2.08081E-07 | 5.28205E-07 | 5.28205E-07 | 5.28205E-07 |
| PSO | Friedman Aligned | 4.93547E-11 | 1.25285E-10 | 1.25285E-10 | 1.25285E-10 |
| PSO | Quade | 2.02938E-01 | 2.88952E-01 | 2.88952E-01 | 2.53595E-01 |
| WW | Friedman | 6.93545E-07 | 2.13398E-06 | 2.13398E-06 | 2.13398E-06 |
| WW | Friedman Aligned | 1.17732E-08 | 4.43760E-08 | 4.43760E-08 | 4.43760E-08 |
| WW | Quade | 2.02938E-01 | 6.53907E-01 | 6.53907E-01 | 4.91488E-01 |
| ISCA | Friedman | 5.43490E-05 | 1.88134E-04 | 1.88134E-04 | 1.88118E-04 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.92346E-01 | 1.0 | 1.0 | 6.97900E-01 |
| GOTLBO | Friedman | 2.33350E-04 | 8.61656E-04 | 8.61656E-04 | 8.61331E-04 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 4.17424E-01 | 1.0 | 1.0 | 8.63978E-01 |
| MABC | Friedman | 9.80244E-04 | 3.69560E-03 | 3.69560E-03 | 3.68975E-03 |
| MABC | Friedman Aligned | 1.16884E-09 | 4.31572E-09 | 4.31572E-09 | 4.31572E-09 |
| MABC | Quade | 4.17424E-01 | 1.0 | 1.0 | 8.63978E-01 |
| DE | Friedman | 5.20298E-01 | 1.0 | 1.0 | 9.33618E-01 |
| DE | Friedman Aligned | 4.19991E-01 | 1.0 | 1.0 | 8.48253E-01 |
| DE | Quade | 8.52896E-01 | 1.0 | 1.0 | 9.98686E-01 |
| **Table S21** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 5.20298E-01 | 1.0 | 1.0 | 9.33618E-01 |
| IJAYA | Friedman Aligned | 2.96026E-01 | 1.0 | 1.0 | 7.26390E-01 |
| IJAYA | Quade | 7.90937E-01 | 1.0 | 1.0 | 9.96908E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S22.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 6.27529E-02 | 6.46470E-02 | 6.46470E-02 | 6.27529E-02 |
| CWOA | Friedman Aligned | 3.90675E-11 | 1.35234E-10 | 1.35234E-10 | 1.35234E-10 |
| CWOA | Quade | 9.63252E-01 | 1.0 | 1.0 | 9.63252E-01 |
| PSO | Friedman | 1.98011E-01 | 5.05235E-01 | 5.05235E-01 | 4.03816E-01 |
| PSO | Friedman Aligned | 8.64602E-09 | 3.19237E-08 | 3.19237E-08 | 3.19237E-08 |
| PSO | Quade | 9.63252E-01 | 1.0 | 1.0 | 9.79096E-01 |
| NNA | Friedman | 1.98011E-01 | 4.00536E-01 | 4.00536E-01 | 3.34604E-01 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 9.63252E-01 | 1.0 | 1.0 | 9.92351E-01 |
| WW | Friedman | 2.51369E-01 | 8.52274E-01 | 8.52274E-01 | 5.89672E-01 |
| WW | Friedman Aligned | 3.28118E-11 | 1.00959E-10 | 1.00959E-10 | 1.00959E-10 |
| WW | Quade | 9.63252E-01 | 1.0 | 1.0 | 9.98990E-01 |
| ISCA | Friedman | 7.68325E-01 | 1.0 | 1.0 | 9.93668E-01 |
| ISCA | Friedman Aligned | 7.18181E-12 | 1.82308E-11 | 1.82308E-11 | 1.82308E-11 |
| ISCA | Quade | 9.63252E-01 | 1.0 | 1.0 | 9.99986E-01 |
| GOTLBO | Friedman | 9.17851E-01 | 1.0 | 1.0 | 9.99902E-01 |
| GOTLBO | Friedman Aligned | 1.29896E-12 | 2.39808E-12 | 2.39808E-12 | 2.39808E-12 |
| GOTLBO | Quade | 9.98660E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S22** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S23.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 2.30926E-13 | 2.30926E-13 | 2.30926E-13 | 2.30926E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.85517E-02 | 9.97146E-02 | 9.97146E-02 | 9.54079E-02 |
| GOTLBO | Friedman | 1.76370E-12 | 3.25606E-12 | 3.25606E-12 | 3.25606E-12 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 5.51141E-02 | 2.06606E-01 | 2.06606E-01 | 1.88865E-01 |
| WW | Friedman | 9.56997E-12 | 2.42930E-11 | 2.42930E-11 | 2.42930E-11 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 1.42835E-02 | 4.41684E-02 | 4.41684E-02 | 4.33008E-02 |
| MABC | Friedman | 1.61944E-11 | 4.98290E-11 | 4.98290E-11 | 4.98290E-11 |
| MABC | Friedman Aligned | 6.35232E-11 | 2.19888E-10 | 2.19888E-10 | 2.19888E-10 |
| MABC | Quade | 5.51141E-02 | 2.10249E-01 | 2.10249E-01 | 1.92225E-01 |
| PSO | Friedman | 2.85766E-11 | 9.89189E-11 | 9.89189E-11 | 9.89189E-11 |
| PSO | Friedman Aligned | 9.31095E-11 | 3.43789E-10 | 3.43789E-10 | 3.43789E-10 |
| PSO | Quade | 9.23007E-03 | 1.33680E-02 | 1.33680E-02 | 1.32864E-02 |
| NNA | Friedman | 4.87447E-11 | 1.79980E-10 | 1.79980E-10 | 1.79980E-10 |
| NNA | Friedman Aligned | 1.82343E-10 | 6.87292E-10 | 6.87292E-10 | 6.87292E-10 |
| NNA | Quade | 9.23007E-03 | 2.20922E-02 | 2.20922E-02 | 2.18717E-02 |
| CWOA | Friedman | 1.08691E-09 | 4.09682E-09 | 4.09682E-09 | 4.09682E-09 |
| CWOA | Friedman Aligned | 3.22900E-11 | 9.93539E-11 | 9.93539E-11 | 9.93539E-11 |
| CWOA | Quade | 9.23007E-03 | 9.26962E-03 | 9.26962E-03 | 9.23007E-03 |
| DE | Friedman | 2.08871E-05 | 7.71220E-05 | 7.16714E-05 | 7.71195E-05 |
| DE | Friedman Aligned | 1.67354E-04 | 5.79317E-04 | 5.79317E-04 | 5.79183E-04 |
| DE | Quade | 2.48241E-01 | 8.96274E-01 | 8.96274E-01 | 6.27573E-01 |
| **Table S23** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 2.08871E-05 | 7.71220E-05 | 7.16714E-05 | 7.71195E-05 |
| IJAYA | Friedman Aligned | 5.49245E-05 | 2.02800E-04 | 2.02800E-04 | 2.02783E-04 |
| IJAYA | Quade | 2.06971E-01 | 7.97941E-01 | 7.97941E-01 | 5.75239E-01 |
| NDE | Friedman | 7.17418E-04 | 2.20762E-03 | 2.20762E-03 | 2.20580E-03 |
| NDE | Friedman Aligned | 5.71229E-03 | 1.75879E-02 | 1.75879E-02 | 1.74722E-02 |
| NDE | Quade | 3.88843E-01 | 1.0 | 1.0 | 7.80209E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S24.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 1.92232E-01 | 2.11737E-01 | 2.11737E-01 | 1.92232E-01 |
| CWOA | Friedman Aligned | 6.82306E-09 | 1.25964E-08 | 1.25964E-08 | 1.25964E-08 |
| CWOA | Quade | 9.75324E-01 | 1.0 | 1.0 | 9.75324E-01 |
| PSO | Friedman | 4.39552E-01 | 1.0 | 1.0 | 7.28974E-01 |
| PSO | Friedman Aligned | 2.73702E-07 | 6.94782E-07 | 6.94782E-07 | 6.94781E-07 |
| PSO | Quade | 9.75324E-01 | 1.0 | 1.0 | 9.86727E-01 |
| NNA | Friedman | 4.39552E-01 | 1.0 | 1.0 | 6.56634E-01 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 9.75324E-01 | 1.0 | 1.0 | 9.95625E-01 |
| WW | Friedman | 4.92980E-01 | 1.0 | 1.0 | 8.76296E-01 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.75324E-01 | 1.0 | 1.0 | 9.99544E-01 |
| ISCA | Friedman | 9.57091E-01 | 1.0 | 1.0 | 9.99982E-01 |
| ISCA | Friedman Aligned | 5.54018E-01 | 1.0 | 1.0 | 9.16636E-01 |
| ISCA | Quade | 9.75324E-01 | 1.0 | 1.0 | 9.99997E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S24** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S25.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.28896E-03 | 1.28973E-03 | 1.28973E-03 | 1.28896E-03 |
| MABC | Friedman | 1.27587E-12 | 2.35545E-12 | 2.35545E-12 | 2.35545E-12 |
| MABC | Friedman Aligned | 1.75948E-09 | 6.63187E-09 | 6.63187E-09 | 6.63187E-09 |
| MABC | Quade | 1.37262E-02 | 5.19022E-02 | 5.19022E-02 | 5.07619E-02 |
| GOTLBO | Friedman | 1.19004E-11 | 3.02087E-11 | 3.02087E-11 | 3.02087E-11 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.33923E-02 | 4.96280E-02 | 4.96280E-02 | 4.85638E-02 |
| ISCA | Friedman | 7.79167E-11 | 2.39744E-10 | 2.39744E-10 | 2.39744E-10 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 5.97483E-03 | 2.07202E-02 | 2.07202E-02 | 2.05304E-02 |
| WW | Friedman | 4.49481E-09 | 1.55589E-08 | 1.55589E-08 | 1.55589E-08 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 2.57937E-03 | 7.94361E-03 | 7.94361E-03 | 7.91528E-03 |
| PSO | Friedman | 1.06456E-08 | 3.93067E-08 | 3.93067E-08 | 3.93067E-08 |
| PSO | Friedman Aligned | 1.41434E-10 | 4.89580E-10 | 4.51671E-10 | 4.89580E-10 |
| PSO | Quade | 1.28896E-03 | 1.97444E-03 | 1.97444E-03 | 1.97266E-03 |
| NNA | Friedman | 1.46074E-08 | 5.50586E-08 | 5.50586E-08 | 5.50586E-08 |
| NNA | Friedman Aligned | 1.41434E-10 | 4.89580E-10 | 4.51671E-10 | 4.89580E-10 |
| NNA | Quade | 1.39422E-03 | 3.54107E-03 | 3.54107E-03 | 3.53537E-03 |
| IJAYA | Friedman | 1.85427E-08 | 6.84653E-08 | 6.55898E-08 | 6.84653E-08 |
| IJAYA | Friedman Aligned | 1.36159E-06 | 5.02741E-06 | 5.02741E-06 | 5.02740E-06 |
| IJAYA | Quade | 7.11225E-02 | 2.66321E-01 | 2.66321E-01 | 2.38460E-01 |
| **Table S25** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.89482E-08 | 6.84653E-08 | 6.55898E-08 | 6.84653E-08 |
| DE | Friedman Aligned | 5.16020E-06 | 1.78623E-05 | 1.78623E-05 | 1.78621E-05 |
| DE | Quade | 9.13398E-02 | 3.20806E-01 | 3.20806E-01 | 2.82197E-01 |
| NDE | Friedman | 2.01368E-06 | 6.19594E-06 | 6.19594E-06 | 6.19592E-06 |
| NDE | Friedman Aligned | 3.70876E-04 | 1.14121E-03 | 1.14121E-03 | 1.14072E-03 |
| NDE | Quade | 1.66209E-01 | 5.21958E-01 | 5.21958E-01 | 4.28391E-01 |
| TLBO | Friedman | 2.05435E-01 | 5.30463E-01 | 5.30463E-01 | 4.42194E-01 |
| TLBO | Friedman Aligned | 4.91056E-01 | 1.0 | 1.0 | 8.19950E-01 |
| TLBO | Quade | 6.72809E-01 | 1.0 | 1.0 | 9.41340E-01 |
| EBLSHADE | Friedman | 8.26822E-01 | 1.0 | 1.0 | 9.60723E-01 |
| EBLSHADE | Friedman Aligned | 7.33523E-01 | 1.0 | 1.0 | 9.12968E-01 |
| EBLSHADE | Quade | 8.85007E-01 | 1.0 | 1.0 | 9.81556E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S26.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 9.99088E-01 | 1.0 | 1.0 | 9.99088E-01 |
| CWOA | Friedman Aligned | 2.64607E-10 | 2.64607E-10 | 2.64607E-10 | 2.64607E-10 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 2.86786E-07 | 5.29452E-07 | 5.29452E-07 | 5.29452E-07 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S26** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S27.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 1.04337E-06 | 1.04337E-06 | 1.04337E-06 | 1.04337E-06 |
| CWOA | Friedman Aligned | 2.99270E-10 | 9.20832E-10 | 9.20832E-10 | 9.20832E-10 |
| CWOA | Quade | 5.51537E-01 | 7.77695E-01 | 7.77695E-01 | 5.51537E-01 |
| NNA | Friedman | 1.81715E-05 | 3.35477E-05 | 3.35477E-05 | 3.35472E-05 |
| NNA | Friedman Aligned | 2.90478E-10 | 7.37368E-10 | 7.37368E-10 | 7.37368E-10 |
| NNA | Quade | 5.51537E-01 | 1.0 | 1.0 | 7.31301E-01 |
| PSO | Friedman | 2.28284E-05 | 5.79495E-05 | 5.79495E-05 | 5.79480E-05 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 5.51537E-01 | 9.45753E-01 | 9.45753E-01 | 6.26599E-01 |
| WW | Friedman | 6.10355E-05 | 1.87806E-04 | 1.87806E-04 | 1.87790E-04 |
| WW | Friedman Aligned | 1.09380E-09 | 3.78623E-09 | 3.78623E-09 | 3.78623E-09 |
| WW | Quade | 5.51537E-01 | 1.0 | 1.0 | 8.60596E-01 |
| ISCA | Friedman | 2.12534E-03 | 7.36176E-03 | 7.36176E-03 | 7.33772E-03 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 6.03485E-01 | 1.0 | 1.0 | 9.59322E-01 |
| GOTLBO | Friedman | 6.56427E-03 | 2.42803E-02 | 2.42803E-02 | 2.40239E-02 |
| GOTLBO | Friedman Aligned | 3.19607E-09 | 1.18009E-08 | 1.18009E-08 | 1.18009E-08 |
| GOTLBO | Quade | 7.44807E-01 | 1.0 | 1.0 | 9.93544E-01 |
| MABC | Friedman | 1.94748E-02 | 7.37379E-02 | 7.37379E-02 | 7.14482E-02 |
| MABC | Friedman Aligned | 1.63074E-06 | 6.14664E-06 | 6.14664E-06 | 6.14663E-06 |
| MABC | Quade | 7.44807E-01 | 1.0 | 1.0 | 9.93544E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S27** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S28.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 4.38236E-01 | 5.64070E-01 | 5.64070E-01 | 4.38236E-01 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 9.98650E-01 | 1.0 | 1.0 | 9.98650E-01 |
| PSO | Friedman | 7.26197E-01 | 1.0 | 1.0 | 9.41422E-01 |
| PSO | Friedman Aligned | 1.22720E-04 | 3.11535E-04 | 3.11535E-04 | 3.11491E-04 |
| PSO | Quade | 9.98650E-01 | 1.0 | 1.0 | 9.99526E-01 |
| NNA | Friedman | 7.26197E-01 | 1.0 | 1.0 | 9.08499E-01 |
| NNA | Friedman Aligned | 2.86687E-09 | 5.29268E-09 | 5.29268E-09 | 5.29268E-09 |
| NNA | Quade | 9.98650E-01 | 1.0 | 1.0 | 9.99934E-01 |
| WW | Friedman | 7.54881E-01 | 1.0 | 1.0 | 9.86782E-01 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.98650E-01 | 1.0 | 1.0 | 9.99999E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S28** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S29.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 9.99864E-01 | 1.0 | 1.0 | 9.99864E-01 |
| CWOA | Friedman Aligned | 9.57403E-01 | 1.0 | 1.0 | 9.57403E-01 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S29** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S30.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S30** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S31.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *n*1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 9.85182E-01 | 1.0 | 1.0 | 9.85182E-01 |
| CWOA | Friedman Aligned | 1.67199E-08 | 3.60651E-08 | 3.60651E-08 | 3.60651E-08 |
| CWOA | Quade | 9.99991E-01 | 1.0 | 1.0 | 9.99991E-01 |
| PSO | Friedman | 9.99446E-01 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.67199E-08 | 3.08676E-08 | 3.08676E-08 | 3.08676E-08 |
| PSO | Quade | 9.99991E-01 | 1.0 | 1.0 | 9.99999E-01 |
| NNA | Friedman | 9.99446E-01 | 1.0 | 1.0 | 9.99999E-01 |
| NNA | Friedman Aligned | 2.58561E-09 | 2.58561E-09 | 2.58561E-09 | 2.58561E-09 |
| NNA | Quade | 9.99991E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S31** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 8.96669E-01 | 1.0 | 1.0 | 9.99613E-01 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 2.25568E-01 | 7.56404E-01 | 7.56404E-01 | 5.44583E-01 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S32.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.58394E-05 | 1.58395E-05 | 1.58395E-05 | 1.58394E-05 |
| GOTLBO | Friedman Aligned | 1.10556E-12 | 2.04103E-12 | 2.04103E-12 | 2.04103E-12 |
| GOTLBO | Quade | 6.53381E-01 | 1.0 | 1.0 | 7.22069E-01 |
| PSO | Friedman | 2.04155E-05 | 3.76906E-05 | 3.76906E-05 | 3.76899E-05 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 6.53381E-01 | 1.0 | 1.0 | 6.53381E-01 |
| ISCA | Friedman | 4.72466E-05 | 1.19936E-04 | 1.19936E-04 | 1.19929E-04 |
| ISCA | Friedman Aligned | 1.10556E-12 | 2.72826E-12 | 2.72826E-12 | 2.72826E-12 |
| ISCA | Quade | 6.53381E-01 | 1.0 | 1.0 | 7.12615E-01 |
| NNA | Friedman | 4.72466E-05 | 1.35747E-04 | 1.35747E-04 | 1.35739E-04 |
| NNA | Friedman Aligned | 1.10556E-12 | 2.75335E-12 | 2.75335E-12 | 2.75335E-12 |
| NNA | Quade | 6.53381E-01 | 1.0 | 1.0 | 7.22069E-01 |
| CWOA | Friedman | 6.04602E-05 | 2.09289E-04 | 2.09289E-04 | 2.09270E-04 |
| CWOA | Friedman Aligned | 6.56553E-10 | 2.27268E-09 | 2.27268E-09 | 2.27268E-09 |
| CWOA | Quade | 6.53381E-01 | 1.0 | 1.0 | 7.63921E-01 |
| WW | Friedman | 2.94224E-03 | 1.08723E-02 | 1.08723E-02 | 1.08207E-02 |
| WW | Friedman Aligned | 1.94472E-05 | 7.18054E-05 | 7.18054E-05 | 7.18031E-05 |
| WW | Quade | 6.53381E-01 | 1.0 | 1.0 | 9.31924E-01 |
| MABC | Friedman | 2.85543E-01 | 1.0 | 1.0 | 7.18420E-01 |
| MABC | Friedman Aligned | 5.68648E-01 | 1.0 | 1.0 | 9.57966E-01 |
| MABC | Quade | 7.47708E-01 | 1.0 | 1.0 | 9.94433E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S32** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.98751E-01 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S33.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Friedman Aligned | 1.40443E-09 | 4.32133E-09 | 4.32133E-09 | 4.32133E-09 |
| GOTLBO | Quade | 2.61275E-03 | 4.15154E-03 | 3.95252E-03 | 4.14372E-03 |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 2.61275E-03 | 2.61590E-03 | 2.61590E-03 | 2.61275E-03 |
| MABC | Friedman | 1.66844E-12 | 4.23528E-12 | 4.23528E-12 | 4.23528E-12 |
| MABC | Friedman Aligned | 1.97530E-05 | 7.44541E-05 | 7.44541E-05 | 7.44517E-05 |
| MABC | Quade | 1.75248E-02 | 6.63245E-02 | 6.63245E-02 | 6.44687E-02 |
| WW | Friedman | 9.41487E-11 | 2.89688E-10 | 2.89688E-10 | 2.89688E-10 |
| WW | Friedman Aligned | <1E-13 | 2.10054E-13 | 2.10054E-13 | 2.10054E-13 |
| WW | Quade | 5.37659E-03 | 1.98809E-02 | 1.98809E-02 | 1.97088E-02 |
| CWOA | Friedman | 7.48653E-09 | 2.59149E-08 | 2.59149E-08 | 2.59149E-08 |
| CWOA | Friedman Aligned | 1.94632E-09 | 7.18643E-09 | 7.18643E-09 | 7.18643E-09 |
| CWOA | Quade | 2.61275E-03 | 6.00747E-03 | 6.00747E-03 | 5.99146E-03 |
| DE | Friedman | 8.54237E-09 | 3.15410E-08 | 3.15118E-08 | 3.15410E-08 |
| DE | Friedman Aligned | 7.66528E-04 | 2.83067E-03 | 2.83067E-03 | 2.82734E-03 |
| DE | Quade | 7.68637E-02 | 2.88156E-01 | 2.51938E-01 | 2.55695E-01 |
| NNA | Friedman | 8.54237E-09 | 3.15410E-08 | 3.15118E-08 | 3.15410E-08 |
| NNA | Friedman Aligned | 1.40443E-09 | 4.60157E-09 | 4.60157E-09 | 4.60157E-09 |
| NNA | Quade | 2.61275E-03 | 4.15154E-03 | 3.95252E-03 | 4.14372E-03 |
| ISCA | Friedman | 8.70900E-09 | 3.21563E-08 | 3.21563E-08 | 3.21563E-08 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.61275E-03 | 3.70459E-03 | 3.70459E-03 | 3.69830E-03 |
| **Table S33** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.00756E-08 | 3.48770E-08 | 3.48770E-08 | 3.48770E-08 |
| IJAYA | Friedman Aligned | 1.77340E-03 | 6.14036E-03 | 6.14036E-03 | 6.12529E-03 |
| IJAYA | Quade | 7.68637E-02 | 2.88156E-01 | 2.51938E-01 | 2.55695E-01 |
| NDE | Friedman | 4.85736E-06 | 1.49457E-05 | 1.49457E-05 | 1.49457E-05 |
| NDE | Friedman Aligned | 6.70249E-02 | 2.07871E-01 | 2.07871E-01 | 1.92221E-01 |
| NDE | Quade | 1.61095E-01 | 5.05559E-01 | 5.05559E-01 | 4.17534E-01 |
| TLBO | Friedman | 2.01098E-01 | 5.19063E-01 | 5.19063E-01 | 4.34434E-01 |
| TLBO | Friedman Aligned | 7.84943E-01 | 1.0 | 1.0 | 9.79783E-01 |
| TLBO | Quade | 7.20831E-01 | 1.0 | 1.0 | 9.60794E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S34.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Friedman Aligned | 2.23361E-09 | 6.87266E-09 | 6.87266E-09 | 6.87266E-09 |
| GOTLBO | Quade | 2.57827E-03 | 4.09880E-03 | 3.90245E-03 | 4.09117E-03 |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 2.57827E-03 | 2.58134E-03 | 2.58134E-03 | 2.57827E-03 |
| MABC | Friedman | 6.35048E-13 | 1.61204E-12 | 1.61204E-12 | 1.61204E-12 |
| MABC | Friedman Aligned | 7.88131E-06 | 2.97065E-05 | 2.97065E-05 | 2.97062E-05 |
| MABC | Quade | 1.73550E-02 | 6.56791E-02 | 6.56791E-02 | 6.38590E-02 |
| WW | Friedman | 1.84926E-10 | 5.69003E-10 | 5.69003E-10 | 5.69003E-10 |
| WW | Friedman Aligned | 3.15599E-13 | 8.01137E-13 | 8.01137E-13 | 8.01137E-13 |
| WW | Quade | 5.31725E-03 | 1.96611E-02 | 1.96611E-02 | 1.94928E-02 |
| DE | Friedman | 4.61292E-09 | 1.59678E-08 | 1.59678E-08 | 1.59678E-08 |
| DE | Friedman Aligned | 3.62181E-04 | 1.33738E-03 | 1.33738E-03 | 1.33663E-03 |
| DE | Quade | 7.62673E-02 | 2.85885E-01 | 2.49968E-01 | 2.53918E-01 |
| IJAYA | Friedman | 6.88175E-09 | 2.54096E-08 | 2.54096E-08 | 2.54096E-08 |
| IJAYA | Friedman Aligned | 8.79672E-04 | 3.04543E-03 | 3.04543E-03 | 3.04172E-03 |
| IJAYA | Quade | 7.62673E-02 | 2.85885E-01 | 2.49968E-01 | 2.53918E-01 |
| CWOA | Friedman | 8.73483E-09 | 3.29236E-08 | 3.29236E-08 | 3.29236E-08 |
| CWOA | Friedman Aligned | 4.27917E-09 | 1.58000E-08 | 1.58000E-08 | 1.58000E-08 |
| CWOA | Quade | 2.57827E-03 | 5.93402E-03 | 5.93402E-03 | 5.91840E-03 |
| NNA | Friedman | 1.17491E-08 | 4.33811E-08 | 4.27586E-08 | 4.33811E-08 |
| NNA | Friedman Aligned | 2.23361E-09 | 7.25937E-09 | 7.25937E-09 | 7.25937E-09 |
| NNA | Quade | 2.57827E-03 | 4.09880E-03 | 3.90245E-03 | 4.09117E-03 |
| **Table S34** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 1.23525E-08 | 4.33811E-08 | 4.27586E-08 | 4.33811E-08 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.57827E-03 | 3.65691E-03 | 3.65691E-03 | 3.65079E-03 |
| NDE | Friedman | 2.55436E-06 | 7.85957E-06 | 7.85957E-06 | 7.85955E-06 |
| NDE | Friedman Aligned | 4.19953E-02 | 1.29854E-01 | 1.29854E-01 | 1.23666E-01 |
| NDE | Quade | 1.60056E-01 | 5.02233E-01 | 5.02233E-01 | 4.15313E-01 |
| TLBO | Friedman | 1.57702E-01 | 4.05499E-01 | 4.05499E-01 | 3.53159E-01 |
| TLBO | Friedman Aligned | 6.48054E-01 | 1.0 | 1.0 | 9.29409E-01 |
| TLBO | Quade | 7.18467E-01 | 1.0 | 1.0 | 9.59945E-01 |
| EBLSHADE | Friedman | 9.13338E-01 | 1.0 | 9.23824E-01 | 9.89059E-01 |
| EBLSHADE | Friedman Aligned | 8.67482E-01 | 1.0 | 1.0 | 9.76034E-01 |
| EBLSHADE | Quade | 9.98363E-01 | 1.0 | 1.0 | 9.99993E-01 |
| STLBO | Friedman | 9.23824E-01 | 1.0 | 9.23824E-01 | 9.89059E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S35.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.27739E-08 | 1.27739E-08 | 1.27739E-08 | 1.27739E-08 |
| GOTLBO | Friedman Aligned | 2.60296E-09 | 8.00911E-09 | 8.00911E-09 | 8.00911E-09 |
| GOTLBO | Quade | 3.14219E-01 | 4.69400E-01 | 4.39320E-01 | 3.81037E-01 |
| PSO | Friedman | 2.06453E-08 | 3.81143E-08 | 3.81143E-08 | 3.81143E-08 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 3.14219E-01 | 3.71777E-01 | 3.71777E-01 | 3.14219E-01 |
| ISCA | Friedman | 6.53133E-08 | 1.65795E-07 | 1.65795E-07 | 1.65795E-07 |
| ISCA | Friedman Aligned | 4.15456E-11 | 1.05462E-10 | 1.05462E-10 | 1.05462E-10 |
| ISCA | Quade | 3.14219E-01 | 4.50989E-01 | 4.39320E-01 | 3.68516E-01 |
| NNA | Friedman | 6.53133E-08 | 1.98658E-07 | 1.98658E-07 | 1.98658E-07 |
| NNA | Friedman Aligned | 2.77977E-09 | 9.62227E-09 | 9.62227E-09 | 9.62227E-09 |
| NNA | Quade | 3.14219E-01 | 4.69400E-01 | 4.39320E-01 | 3.81037E-01 |
| CWOA | Friedman | 1.02048E-07 | 3.53244E-07 | 3.53244E-07 | 3.53244E-07 |
| CWOA | Friedman Aligned | <1E-13 | 1.78524E-13 | 1.78524E-13 | 1.78524E-13 |
| CWOA | Quade | 3.14219E-01 | 5.48252E-01 | 5.48252E-01 | 4.32016E-01 |
| WW | Friedman | 1.69355E-05 | 6.25314E-05 | 6.25314E-05 | 6.25297E-05 |
| WW | Friedman Aligned | 4.63527E-09 | 1.71148E-08 | 1.71148E-08 | 1.71148E-08 |
| WW | Quade | 3.14219E-01 | 1.0 | 1.0 | 6.85077E-01 |
| MABC | Friedman | 1.47478E-02 | 5.57785E-02 | 5.57785E-02 | 5.44627E-02 |
| MABC | Friedman Aligned | 2.56191E-02 | 9.71425E-02 | 9.71425E-02 | 9.31905E-02 |
| MABC | Quade | 4.65703E-01 | 1.0 | 1.0 | 9.05822E-01 |
| DE | Friedman | 3.11442E-01 | 1.0 | 1.0 | 7.47869E-01 |
| DE | Friedman Aligned | 1.88248E-01 | 7.22700E-01 | 7.22700E-01 | 5.37019E-01 |
| DE | Quade | 8.21502E-01 | 1.0 | 1.0 | 9.98275E-01 |
| **Table S35** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 3.29145E-01 | 1.0 | 1.0 | 7.48888E-01 |
| IJAYA | Friedman Aligned | 2.72182E-01 | 9.87202E-01 | 9.87202E-01 | 6.67044E-01 |
| IJAYA | Quade | 8.21502E-01 | 1.0 | 1.0 | 9.98275E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S36.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 6.84156E-03 | 6.86326E-03 | 6.86326E-03 | 6.84156E-03 |
| GOTLBO | Friedman Aligned | 1.87628E-12 | 2.89635E-12 | 2.89635E-12 | 2.89635E-12 |
| GOTLBO | Quade | 9.80537E-01 | 1.0 | 1.0 | 9.89041E-01 |
| PSO | Friedman | 6.84988E-03 | 1.26827E-02 | 1.26827E-02 | 1.26093E-02 |
| PSO | Friedman Aligned | 7.99504E-09 | 2.46001E-08 | 2.46001E-08 | 2.46001E-08 |
| PSO | Quade | 9.80537E-01 | 1.0 | 1.0 | 9.80537E-01 |
| ISCA | Friedman | 1.11987E-02 | 2.85508E-02 | 2.85508E-02 | 2.81832E-02 |
| ISCA | Friedman Aligned | 5.83509E-10 | 1.48121E-09 | 1.48121E-09 | 1.48121E-09 |
| ISCA | Quade | 9.80537E-01 | 1.0 | 1.0 | 9.88524E-01 |
| NNA | Friedman | 1.11987E-02 | 3.03504E-02 | 3.03504E-02 | 2.99392E-02 |
| NNA | Friedman Aligned | 1.87628E-12 | 1.87628E-12 | 1.87628E-12 | 1.87628E-12 |
| NNA | Quade | 9.80537E-01 | 1.0 | 1.0 | 9.89041E-01 |
| CWOA | Friedman | 1.15188E-02 | 4.00150E-02 | 4.00150E-02 | 3.93107E-02 |
| CWOA | Friedman Aligned | 1.52119E-07 | 5.26565E-07 | 5.26565E-07 | 5.26565E-07 |
| CWOA | Quade | 9.80537E-01 | 1.0 | 1.0 | 9.92456E-01 |
| WW | Friedman | 1.44016E-01 | 5.54046E-01 | 5.54046E-01 | 4.36826E-01 |
| WW | Friedman Aligned | 8.90158E-04 | 3.28753E-03 | 3.28753E-03 | 3.28280E-03 |
| WW | Quade | 9.80537E-01 | 1.0 | 1.0 | 9.99848E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S36** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S37.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 2.04947E-13 | 2.04947E-13 | 2.04947E-13 | 2.04947E-13 |
| WW | Friedman Aligned | 1.71270E-13 | 4.34763E-13 | 4.34763E-13 | 4.34763E-13 |
| WW | Quade | 2.09412E-02 | 7.77621E-02 | 7.77621E-02 | 7.51674E-02 |
| CWOA | Friedman | 2.93825E-11 | 5.42446E-11 | 5.42446E-11 | 5.42446E-11 |
| CWOA | Friedman Aligned | 5.78031E-10 | 1.77856E-09 | 1.71036E-09 | 1.77856E-09 |
| CWOA | Quade | 1.35083E-02 | 2.74130E-02 | 2.74130E-02 | 2.70814E-02 |
| ISCA | Friedman | 3.89592E-11 | 1.17459E-10 | 1.17459E-10 | 1.17459E-10 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 1.35083E-02 | 1.83968E-02 | 1.83968E-02 | 1.82425E-02 |
| NNA | Friedman | 3.89592E-11 | 9.88964E-11 | 9.88964E-11 | 9.88964E-11 |
| NNA | Friedman Aligned | 5.78031E-10 | 1.77856E-09 | 1.71036E-09 | 1.77856E-09 |
| NNA | Quade | 1.35083E-02 | 2.01743E-02 | 1.91111E-02 | 1.99904E-02 |
| PSO | Friedman | 1.23417E-10 | 4.27212E-10 | 4.27212E-10 | 4.27212E-10 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 1.35083E-02 | 1.35932E-02 | 1.35932E-02 | 1.35083E-02 |
| GOTLBO | Friedman | 2.64018E-10 | 9.74834E-10 | 9.74834E-10 | 9.74834E-10 |
| GOTLBO | Friedman Aligned | 5.78031E-10 | 1.77856E-09 | 1.71036E-09 | 1.77856E-09 |
| GOTLBO | Quade | 1.35083E-02 | 2.01743E-02 | 1.91111E-02 | 1.99904E-02 |
| MABC | Friedman | 6.34021E-09 | 2.38977E-08 | 2.38977E-08 | 2.38977E-08 |
| MABC | Friedman Aligned | 9.29163E-05 | 3.50231E-04 | 3.50231E-04 | 3.50178E-04 |
| MABC | Quade | 5.71120E-02 | 2.18187E-01 | 2.18187E-01 | 1.98812E-01 |
| DE | Friedman | 9.58882E-06 | 3.54050E-05 | 3.54050E-05 | 3.54044E-05 |
| DE | Friedman Aligned | 2.67052E-03 | 9.86544E-03 | 9.86544E-03 | 9.82497E-03 |
| DE | Quade | 1.93779E-01 | 7.44857E-01 | 6.46164E-01 | 5.48560E-01 |
| **Table S37** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.33429E-05 | 4.61871E-05 | 4.61871E-05 | 4.61862E-05 |
| IJAYA | Friedman Aligned | 5.66798E-03 | 1.96371E-02 | 1.96371E-02 | 1.94834E-02 |
| IJAYA | Quade | 1.93779E-01 | 7.44857E-01 | 6.46164E-01 | 5.48560E-01 |
| NDE | Friedman | 1.43301E-03 | 4.40998E-03 | 4.40998E-03 | 4.40270E-03 |
| NDE | Friedman Aligned | 1.41455E-01 | 4.42799E-01 | 4.42799E-01 | 3.74549E-01 |
| NDE | Quade | 3.43054E-01 | 1.0 | 1.0 | 7.25493E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S38.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 2.72905E-06 | 2.72905E-06 | 2.72905E-06 | 2.72905E-06 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S38** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S39.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Friedman Aligned | 2.23361E-09 | 6.87266E-09 | 6.87266E-09 | 6.87266E-09 |
| GOTLBO | Quade | 2.38776E-03 | 3.80690E-03 | 3.62535E-03 | 3.80032E-03 |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 2.38776E-03 | 2.39040E-03 | 2.39040E-03 | 2.38776E-03 |
| MABC | Friedman | 1.28357E-12 | 3.25828E-12 | 3.25828E-12 | 3.25828E-12 |
| MABC | Friedman Aligned | 7.88131E-06 | 2.97065E-05 | 2.97065E-05 | 2.97062E-05 |
| MABC | Quade | 1.64044E-02 | 6.20680E-02 | 6.20680E-02 | 6.04412E-02 |
| WW | Friedman | 1.13508E-10 | 3.49256E-10 | 3.49256E-10 | 3.49256E-10 |
| WW | Friedman Aligned | 3.15599E-13 | 8.01137E-13 | 8.01137E-13 | 8.01137E-13 |
| WW | Quade | 4.98681E-03 | 1.84376E-02 | 1.84376E-02 | 1.82896E-02 |
| DE | Friedman | 8.25810E-09 | 2.85857E-08 | 2.63838E-08 | 2.85857E-08 |
| DE | Friedman Aligned | 3.62181E-04 | 1.33738E-03 | 1.33738E-03 | 1.33663E-03 |
| DE | Quade | 7.29045E-02 | 2.73093E-01 | 2.38867E-01 | 2.43841E-01 |
| CWOA | Friedman | 8.25810E-09 | 2.85857E-08 | 2.63838E-08 | 2.85857E-08 |
| CWOA | Friedman Aligned | 4.27917E-09 | 1.58000E-08 | 1.58000E-08 | 1.58000E-08 |
| CWOA | Quade | 2.38776E-03 | 5.52683E-03 | 5.52683E-03 | 5.51327E-03 |
| IJAYA | Friedman | 9.53069E-09 | 3.59234E-08 | 3.04931E-08 | 3.59234E-08 |
| IJAYA | Friedman Aligned | 8.79672E-04 | 3.04543E-03 | 3.04543E-03 | 3.04172E-03 |
| IJAYA | Quade | 7.29045E-02 | 2.73093E-01 | 2.38867E-01 | 2.43841E-01 |
| ISCA | Friedman | 9.53069E-09 | 3.59234E-08 | 3.04931E-08 | 3.59234E-08 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.38776E-03 | 3.39323E-03 | 3.39323E-03 | 3.38795E-03 |
| **Table S39** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NNA | Friedman | 9.53069E-09 | 3.59234E-08 | 3.04931E-08 | 3.59234E-08 |
| NNA | Friedman Aligned | 2.23361E-09 | 7.25937E-09 | 7.25937E-09 | 7.25937E-09 |
| NNA | Quade | 2.38776E-03 | 3.80690E-03 | 3.62535E-03 | 3.80032E-03 |
| NDE | Friedman | 4.08314E-06 | 1.25635E-05 | 1.25635E-05 | 1.25635E-05 |
| NDE | Friedman Aligned | 4.19953E-02 | 1.29854E-01 | 1.29854E-01 | 1.23666E-01 |
| NDE | Quade | 1.54173E-01 | 4.83401E-01 | 4.83401E-01 | 4.02619E-01 |
| TLBO | Friedman | 1.88486E-01 | 4.85963E-01 | 4.85963E-01 | 4.11494E-01 |
| TLBO | Friedman Aligned | 6.48054E-01 | 1.0 | 1.0 | 9.29409E-01 |
| TLBO | Quade | 7.04858E-01 | 1.0 | 9.84554E-01 | 9.54846E-01 |
| EBLSHADE | Friedman | 9.78729E-01 | 1.0 | 1.0 | 9.99182E-01 |
| EBLSHADE | Friedman Aligned | 8.67482E-01 | 1.0 | 1.0 | 9.76034E-01 |
| EBLSHADE | Quade | 9.87023E-01 | 1.0 | 9.84554E-01 | 9.99671E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 9.87023E-01 | 1.0 | 9.84554E-01 | 9.99671E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S40.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S40** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S41.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 9.73564E-06 | 9.73569E-06 | 9.73569E-06 | 9.73564E-06 |
| GOTLBO | Friedman Aligned | 4.31832E-12 | 1.09619E-11 | 1.09619E-11 | 1.09619E-11 |
| GOTLBO | Quade | 6.70250E-01 | 1.0 | 1.0 | 7.37556E-01 |
| PSO | Friedman | 1.27717E-05 | 2.35787E-05 | 2.35787E-05 | 2.35785E-05 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 6.70250E-01 | 1.0 | 1.0 | 6.70250E-01 |
| ISCA | Friedman | 3.02807E-05 | 7.68673E-05 | 7.68673E-05 | 7.68646E-05 |
| ISCA | Friedman Aligned | 2.29483E-13 | 4.23661E-13 | 4.23661E-13 | 4.23661E-13 |
| ISCA | Quade | 6.70250E-01 | 1.0 | 1.0 | 7.28467E-01 |
| NNA | Friedman | 3.02807E-05 | 8.73835E-05 | 8.73835E-05 | 8.73801E-05 |
| NNA | Friedman Aligned | 5.02987E-12 | 1.54765E-11 | 1.54765E-11 | 1.54765E-11 |
| NNA | Quade | 6.70250E-01 | 1.0 | 1.0 | 7.37556E-01 |
| CWOA | Friedman | 3.93486E-05 | 1.36208E-04 | 1.36208E-04 | 1.36200E-04 |
| CWOA | Friedman Aligned | 1.16523E-10 | 4.03347E-10 | 4.03347E-10 | 4.03347E-10 |
| CWOA | Quade | 6.70250E-01 | 1.0 | 1.0 | 7.78072E-01 |
| WW | Friedman | 2.10239E-03 | 7.76707E-03 | 7.76707E-03 | 7.74073E-03 |
| WW | Friedman Aligned | 5.51419E-06 | 2.03601E-05 | 2.03601E-05 | 2.03600E-05 |
| WW | Quade | 6.70250E-01 | 1.0 | 1.0 | 9.38720E-01 |
| MABC | Friedman | 2.41545E-01 | 9.68227E-01 | 9.68227E-01 | 6.47281E-01 |
| MABC | Friedman Aligned | 4.01332E-01 | 1.0 | 1.0 | 8.55401E-01 |
| MABC | Quade | 7.60748E-01 | 1.0 | 1.0 | 9.95442E-01 |
| DE | Friedman | 9.84761E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 9.21905E-01 | 1.0 | 1.0 | 9.99918E-01 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S41** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S42.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 9.99999E-01 | 1.0 | 1.0 | 9.99999E-01 |
| GOTLBO | Friedman Aligned | 9.23523E-01 | 1.0 | 1.0 | 9.92894E-01 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 9.99999E-01 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.42884E-08 | 1.42884E-08 | 1.42884E-08 | 1.42884E-08 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S42** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 9.23523E-01 | 1.0 | 1.0 | 9.91314E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S43.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 9.99996E-01 | 1.0 | 1.0 | 9.99996E-01 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 9.99996E-01 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 3.95810E-06 | 3.95810E-06 | 3.95810E-06 | 3.95810E-06 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 9.99999E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S43** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S44.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *R*p1 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 9.99951E-01 | 1.0 | 1.0 | 9.99951E-01 |
| GOTLBO | Friedman Aligned | 2.69091E-01 | 6.09156E-01 | 6.09156E-01 | 4.65633E-01 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 9.99951E-01 | 1.0 | 1.0 | 9.99998E-01 |
| PSO | Friedman Aligned | 1.74407E-11 | 1.74407E-11 | 1.74407E-11 | 1.74407E-11 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 9.99951E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 7.07645E-01 | 1.0 | 1.0 | 9.77267E-01 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.99951E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 2.69091E-01 | 5.64974E-01 | 5.64974E-01 | 4.39377E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S44** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S45.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *R*p1evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 7.42350E-01 | 1.0 | 1.0 | 7.42350E-01 |
| GOTLBO | Friedman Aligned | 6.80259E-04 | 1.52988E-03 | 1.52988E-03 | 1.52881E-03 |
| GOTLBO | Quade | 9.99837E-01 | 1.0 | 1.0 | 9.99953E-01 |
| PSO | Friedman | 7.42350E-01 | 1.0 | 1.0 | 8.46939E-01 |
| PSO | Friedman Aligned | 2.26308E-10 | 2.26308E-10 | 2.26308E-10 | 2.26308E-10 |
| PSO | Quade | 9.99837E-01 | 1.0 | 1.0 | 9.99837E-01 |
| ISCA | Friedman | 7.42350E-01 | 1.0 | 1.0 | 9.45174E-01 |
| ISCA | Friedman Aligned | 1.21307E-02 | 3.74832E-02 | 3.74832E-02 | 3.68572E-02 |
| ISCA | Quade | 9.99837E-01 | 1.0 | 1.0 | 9.99947E-01 |
| NNA | Friedman | 7.42350E-01 | 1.0 | 1.0 | 9.45174E-01 |
| NNA | Friedman Aligned | 6.80259E-04 | 1.25623E-03 | 1.25623E-03 | 1.25550E-03 |
| NNA | Quade | 9.99837E-01 | 1.0 | 1.0 | 9.99953E-01 |
| CWOA | Friedman | 7.42350E-01 | 1.0 | 1.0 | 9.61674E-01 |
| CWOA | Friedman Aligned | 1.44448E-01 | 5.24146E-01 | 5.24146E-01 | 4.17268E-01 |
| CWOA | Quade | 9.99837E-01 | 1.0 | 1.0 | 9.99984E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S45** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S46.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.07433E-01 | 3.62209E-01 | 3.62209E-01 | 3.07433E-01 |
| PSO | Friedman Aligned | 1.93615E-05 | 1.93617E-05 | 1.93617E-05 | 1.93615E-05 |
| PSO | Quade | 9.96926E-01 | 1.0 | 1.0 | 9.96926E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S46** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S47.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 3.11751E-13 | 8.99281E-13 | 8.99281E-13 | 8.99281E-13 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 3.35107E-02 | 8.46505E-02 | 8.46505E-02 | 8.14674E-02 |
| IJAYA | Friedman | 3.11751E-13 | 8.41549E-13 | 8.41549E-13 | 8.41549E-13 |
| IJAYA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| IJAYA | Quade | 3.35107E-02 | 6.27616E-02 | 6.27616E-02 | 6.09874E-02 |
| NNA | Friedman | 3.11751E-13 | 3.32179E-13 | 3.32179E-13 | 3.32179E-13 |
| NNA | Friedman Aligned | 1.48834E-09 | 4.57951E-09 | 4.57951E-09 | 4.57951E-09 |
| NNA | Quade | 3.35256E-02 | 1.16402E-01 | 1.02123E-01 | 1.10644E-01 |
| CWOA | Friedman | 3.11751E-13 | 3.11751E-13 | 3.11751E-13 | 3.11751E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 3.35256E-02 | 1.04376E-01 | 9.59914E-02 | 9.96075E-02 |
| WW | Friedman | 3.11751E-13 | 3.30402E-13 | 3.30402E-13 | 3.30402E-13 |
| WW | Friedman Aligned | 2.28617E-13 | 7.91367E-13 | 7.91367E-13 | 7.91367E-13 |
| WW | Quade | 3.35256E-02 | 1.04376E-01 | 9.59914E-02 | 9.96075E-02 |
| MABC | Friedman | 3.78623E-13 | 1.39799E-12 | 1.24967E-12 | 1.39799E-12 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 3.35256E-02 | 1.16402E-01 | 1.02123E-01 | 1.10644E-01 |
| GOTLBO | Friedman | 3.78623E-13 | 1.39799E-12 | 1.22324E-12 | 1.39799E-12 |
| GOTLBO | Friedman Aligned | 4.42446E-10 | 1.63365E-09 | 1.63365E-09 | 1.63365E-09 |
| GOTLBO | Quade | 3.35256E-02 | 1.16402E-01 | 1.04050E-01 | 1.10644E-01 |
| ISCA | Friedman | 3.78623E-13 | 1.39799E-12 | 1.22324E-12 | 1.39799E-12 |
| ISCA | Friedman Aligned | 1.21214E-09 | 4.19586E-09 | 4.19586E-09 | 4.19586E-09 |
| ISCA | Quade | 3.35256E-02 | 1.16402E-01 | 1.11569E-01 | 1.10644E-01 |
| **Table S47** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 7.79360E-10 | 2.69779E-09 | 2.69779E-09 | 2.69779E-09 |
| NDE | Friedman Aligned | 4.65894E-12 | 1.72022E-11 | 1.72022E-11 | 1.72022E-11 |
| NDE | Quade | 5.14231E-02 | 1.59184E-01 | 1.59184E-01 | 1.49931E-01 |
| PSO | Friedman | 9.39925E-09 | 2.89208E-08 | 2.89208E-08 | 2.89208E-08 |
| PSO | Friedman Aligned | 6.99497E-11 | 2.63656E-10 | 2.63656E-10 | 2.63656E-10 |
| PSO | Quade | 4.42167E-03 | 4.43072E-03 | 4.43072E-03 | 4.42167E-03 |
| TLBO | Friedman | 1.21775E-01 | 3.12161E-01 | 3.12161E-01 | 2.80806E-01 |
| TLBO | Friedman Aligned | 2.56398E-01 | 6.65169E-01 | 6.65169E-01 | 5.28586E-01 |
| TLBO | Quade | 6.64444E-01 | 1.0 | 1.0 | 9.37458E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S48.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | 1.37251E-10 | 4.75100E-10 | 4.75100E-10 | 4.75100E-10 |
| PSO | Quade | 1.26537E-03 | 1.26611E-03 | 1.26611E-03 | 1.26537E-03 |
| MABC | Friedman | 1.32783E-13 | 2.45137E-13 | 2.37588E-13 | 2.45137E-13 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 1.30356E-02 | 4.64870E-02 | 4.07958E-02 | 4.55525E-02 |
| GOTLBO | Friedman | 1.32783E-13 | 2.61346E-13 | 2.37588E-13 | 2.61346E-13 |
| GOTLBO | Friedman Aligned | 3.62435E-09 | 1.33822E-08 | 1.33822E-08 | 1.33822E-08 |
| GOTLBO | Quade | 1.30356E-02 | 4.64870E-02 | 4.23263E-02 | 4.55525E-02 |
| ISCA | Friedman | 1.32783E-13 | 2.61346E-13 | 2.37588E-13 | 2.61346E-13 |
| ISCA | Friedman Aligned | 7.90632E-09 | 2.73680E-08 | 2.73680E-08 | 2.73680E-08 |
| ISCA | Quade | 1.34430E-02 | 4.66302E-02 | 4.66302E-02 | 4.57685E-02 |
| NNA | Friedman | 3.34843E-13 | 1.15907E-12 | 1.12266E-12 | 1.15907E-12 |
| NNA | Friedman Aligned | 9.12892E-09 | 2.80890E-08 | 2.80890E-08 | 2.80890E-08 |
| NNA | Quade | 1.30356E-02 | 4.64870E-02 | 4.07958E-02 | 4.55525E-02 |
| WW | Friedman | 3.34843E-13 | 1.15907E-12 | 1.12266E-12 | 1.15907E-12 |
| WW | Friedman Aligned | 1.56092E-12 | 4.80282E-12 | 4.80282E-12 | 4.80282E-12 |
| WW | Quade | 1.30356E-02 | 4.02919E-02 | 3.71360E-02 | 3.95691E-02 |
| CWOA | Friedman | 2.43957E-12 | 9.19531E-12 | 9.19531E-12 | 9.19531E-12 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.30356E-02 | 4.02919E-02 | 3.71360E-02 | 3.95691E-02 |
| IJAYA | Friedman | 6.38042E-12 | 2.35585E-11 | 2.26019E-11 | 2.35585E-11 |
| IJAYA | Friedman Aligned | 2.28953E-09 | 8.62977E-09 | 8.62977E-09 | 8.62977E-09 |
| IJAYA | Quade | 1.22051E-02 | 2.26497E-02 | 2.26497E-02 | 2.24160E-02 |
| **Table S48** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 6.52944E-12 | 2.35585E-11 | 2.26019E-11 | 2.35585E-11 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 1.24297E-02 | 3.17044E-02 | 3.17044E-02 | 3.12514E-02 |
| NDE | Friedman | 1.48064E-11 | 4.55582E-11 | 4.55582E-11 | 4.55582E-11 |
| NDE | Friedman Aligned | 6.02958E-10 | 2.22631E-09 | 2.22631E-09 | 2.22631E-09 |
| NDE | Quade | 2.30164E-02 | 7.10095E-02 | 7.10095E-02 | 6.91409E-02 |
| TLBO | Friedman | 3.18582E-02 | 8.10716E-02 | 8.10716E-02 | 7.89005E-02 |
| TLBO | Friedman Aligned | 3.76448E-02 | 9.58407E-02 | 9.58407E-02 | 9.28115E-02 |
| TLBO | Quade | 4.57286E-01 | 1.0 | 9.51773E-01 | 7.88058E-01 |
| EBLSHADE | Friedman | 5.87176E-01 | 1.0 | 8.11070E-01 | 8.04727E-01 |
| EBLSHADE | Friedman Aligned | 3.79133E-01 | 7.11894E-01 | 7.11894E-01 | 5.85196E-01 |
| EBLSHADE | Quade | 7.80025E-01 | 1.0 | 9.51773E-01 | 9.38917E-01 |
| STLBO | Friedman | 8.11070E-01 | 1.0 | 8.11070E-01 | 8.11070E-01 |
| STLBO | Friedman Aligned | 9.94880E-01 | 9.94880E-01 | 9.94880E-01 | 9.94880E-01 |
| STLBO | Quade | 9.51773E-01 | 1.0 | 9.51773E-01 | 9.51773E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S49.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 4.14742E-04 | 4.14821E-04 | 4.14821E-04 | 4.14742E-04 |
| PSO | Friedman Aligned | 3.02198E-08 | 5.57904E-08 | 5.57904E-08 | 5.57904E-08 |
| PSO | Quade | 8.28789E-01 | 1.0 | 1.0 | 8.28789E-01 |
| DE | Friedman | 2.83400E-01 | 5.99704E-01 | 5.81181E-01 | 4.59472E-01 |
| DE | Friedman Aligned | 5.25358E-13 | 5.25358E-13 | 5.25358E-13 | 5.25358E-13 |
| DE | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99815E-01 |
| IJAYA | Friedman | 2.83400E-01 | 5.99704E-01 | 5.81181E-01 | 4.59472E-01 |
| IJAYA | Friedman Aligned | 1.33614E-02 | 4.94618E-02 | 4.94618E-02 | 4.84535E-02 |
| IJAYA | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99403E-01 |
| CWOA | Friedman | 2.83400E-01 | 7.89202E-01 | 7.89202E-01 | 5.60486E-01 |
| CWOA | Friedman Aligned | 3.39155E-06 | 1.04356E-05 | 1.04356E-05 | 1.04355E-05 |
| CWOA | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99926E-01 |
| NNA | Friedman | 3.54469E-01 | 1.0 | 1.0 | 7.80203E-01 |
| NNA | Friedman Aligned | 1.07552E-03 | 3.72420E-03 | 3.72420E-03 | 3.71804E-03 |
| NNA | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99931E-01 |
| WW | Friedman | 3.54469E-01 | 1.0 | 1.0 | 7.80203E-01 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99926E-01 |
| MABC | Friedman | 4.01459E-01 | 1.0 | 1.0 | 8.55518E-01 |
| MABC | Friedman Aligned | 1.04059E-07 | 2.64149E-07 | 2.64149E-07 | 2.64149E-07 |
| MABC | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99931E-01 |
| GOTLBO | Friedman | 4.01459E-01 | 1.0 | 1.0 | 8.55518E-01 |
| GOTLBO | Friedman Aligned | 6.40261E-03 | 2.41687E-02 | 2.41687E-02 | 2.39198E-02 |
| GOTLBO | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99931E-01 |
| **Table S49** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 4.01459E-01 | 1.0 | 1.0 | 8.55518E-01 |
| ISCA | Friedman Aligned | 1.50390E-03 | 5.55512E-03 | 5.55512E-03 | 5.54164E-03 |
| ISCA | Quade | 9.82071E-01 | 1.0 | 1.0 | 9.99931E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S50.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.32214E-02 | 3.37419E-02 | 3.37419E-02 | 3.32214E-02 |
| PSO | Friedman Aligned | 5.02265E-12 | 5.02265E-12 | 5.02265E-12 | 5.02265E-12 |
| PSO | Quade | 9.77998E-01 | 1.0 | 1.0 | 9.77998E-01 |
| DE | Friedman | 9.69804E-01 | 1.0 | 1.0 | 9.98438E-01 |
| DE | Friedman Aligned | 8.55596E-02 | 1.63995E-01 | 1.63995E-01 | 1.52213E-01 |
| DE | Quade | 9.99780E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 9.69804E-01 | 1.0 | 1.0 | 9.98438E-01 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.99780E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.69804E-01 | 1.0 | 1.0 | 9.99595E-01 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 9.99780E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.81260E-01 | 1.0 | 1.0 | 9.99999E-01 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.81260E-01 | 1.0 | 1.0 | 9.99999E-01 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.99780E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 9.99360E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 9.99360E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S50** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S51.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 5.47757E-11 | 5.47757E-11 | 5.47757E-11 | 5.47757E-11 |
| PSO | Friedman Aligned | 5.78066E-11 | 2.00100E-10 | 2.00100E-10 | 2.00100E-10 |
| PSO | Quade | 2.81980E-02 | 2.85718E-02 | 2.85718E-02 | 2.81980E-02 |
| DE | Friedman | 4.02282E-10 | 7.42675E-10 | 7.42675E-10 | 7.42675E-10 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 1.40685E-01 | 3.51358E-01 | 3.51358E-01 | 3.00292E-01 |
| IJAYA | Friedman | 4.02282E-10 | 7.97424E-10 | 7.97424E-10 | 7.97424E-10 |
| IJAYA | Friedman Aligned | 3.62409E-09 | 1.33812E-08 | 1.33812E-08 | 1.33812E-08 |
| IJAYA | Quade | 1.40685E-01 | 2.76675E-01 | 2.76675E-01 | 2.44151E-01 |
| CWOA | Friedman | 7.58384E-10 | 2.33349E-09 | 2.33349E-09 | 2.33349E-09 |
| CWOA | Friedman Aligned | 2.81525E-09 | 1.06113E-08 | 1.06113E-08 | 1.06113E-08 |
| CWOA | Quade | 1.40685E-01 | 4.12529E-01 | 3.77842E-01 | 3.43793E-01 |
| NNA | Friedman | 4.96355E-09 | 1.71815E-08 | 1.64311E-08 | 1.71815E-08 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.40685E-01 | 4.35460E-01 | 3.77842E-01 | 3.60942E-01 |
| WW | Friedman | 4.96355E-09 | 1.71815E-08 | 1.64311E-08 | 1.71815E-08 |
| WW | Friedman Aligned | 8.94877E-10 | 3.30416E-09 | 3.30416E-09 | 3.30416E-09 |
| WW | Quade | 1.40685E-01 | 4.12529E-01 | 3.77842E-01 | 3.43793E-01 |
| MABC | Friedman | 1.60093E-08 | 6.03426E-08 | 4.96032E-08 | 6.03426E-08 |
| MABC | Friedman Aligned | 8.61753E-09 | 2.98299E-08 | 2.55256E-08 | 2.98299E-08 |
| MABC | Quade | 1.40685E-01 | 4.35460E-01 | 3.77842E-01 | 3.60942E-01 |
| GOTLBO | Friedman | 1.60093E-08 | 6.03426E-08 | 4.96032E-08 | 6.03426E-08 |
| GOTLBO | Friedman Aligned | 8.61753E-09 | 2.98299E-08 | 2.55256E-08 | 2.98299E-08 |
| GOTLBO | Quade | 1.40685E-01 | 4.35460E-01 | 3.77842E-01 | 3.60942E-01 |
| **Table S51** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 1.60093E-08 | 6.03426E-08 | 4.96032E-08 | 6.03426E-08 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 1.40685E-01 | 4.35460E-01 | 3.87838E-01 | 3.60942E-01 |
| NDE | Friedman | 5.77124E-06 | 1.77577E-05 | 1.77577E-05 | 1.77575E-05 |
| NDE | Friedman Aligned | 4.58966E-13 | 1.41220E-12 | 1.41220E-12 | 1.41220E-12 |
| NDE | Quade | 1.58827E-01 | 4.98296E-01 | 4.98296E-01 | 4.12676E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S52.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.58882E-02 | 3.64967E-02 | 3.64967E-02 | 3.58882E-02 |
| PSO | Friedman Aligned | 1.81719E-08 | 1.81719E-08 | 1.81719E-08 | 1.81719E-08 |
| PSO | Quade | 9.66028E-01 | 1.0 | 1.0 | 9.66028E-01 |
| DE | Friedman | 9.74166E-01 | 1.0 | 1.0 | 9.98829E-01 |
| DE | Friedman Aligned | 1.92213E-06 | 3.54855E-06 | 3.54855E-06 | 3.54855E-06 |
| DE | Quade | 9.99387E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 9.74166E-01 | 1.0 | 1.0 | 9.98829E-01 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.99387E-01 | 1.0 | 1.0 | 9.99999E-01 |
| CWOA | Friedman | 9.74166E-01 | 1.0 | 1.0 | 9.99716E-01 |
| CWOA | Friedman Aligned | 1.53881E-01 | 5.01146E-01 | 5.01146E-01 | 4.01985E-01 |
| CWOA | Quade | 9.99387E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.85128E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 8.70151E-01 | 1.0 | 1.0 | 9.99147E-01 |
| NNA | Quade | 9.99387E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.85128E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.99387E-01 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S52** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 3.33973E-02 | 8.58886E-02 | 8.58886E-02 | 8.26128E-02 |
| MABC | Quade | 9.99387E-01 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 8.90777E-01 | 1.0 | 1.0 | 9.99719E-01 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S53.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | 1.36951E-10 | 4.74063E-10 | 4.74063E-10 | 4.74063E-10 |
| PSO | Quade | 1.62108E-03 | 1.62229E-03 | 1.62229E-03 | 1.62108E-03 |
| MABC | Friedman | 1.02474E-13 | 1.89182E-13 | 1.77636E-13 | 1.89182E-13 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 1.57469E-02 | 5.58419E-02 | 4.90027E-02 | 5.44965E-02 |
| GOTLBO | Friedman | 1.02474E-13 | 1.89182E-13 | 1.73417E-13 | 1.89182E-13 |
| GOTLBO | Friedman Aligned | 3.57744E-09 | 1.32090E-08 | 1.32090E-08 | 1.32090E-08 |
| GOTLBO | Quade | 1.57469E-02 | 5.58419E-02 | 5.06633E-02 | 5.44965E-02 |
| ISCA | Friedman | 1.02474E-13 | 1.89182E-13 | 1.73417E-13 | 1.89182E-13 |
| ISCA | Friedman Aligned | 7.81461E-09 | 2.70506E-08 | 2.70506E-08 | 2.70506E-08 |
| ISCA | Quade | 1.60006E-02 | 5.58419E-02 | 5.55239E-02 | 5.44965E-02 |
| NNA | Friedman | 1.02474E-13 | 2.11831E-13 | 2.02505E-13 | 2.11831E-13 |
| NNA | Friedman Aligned | 9.02635E-09 | 2.77734E-08 | 2.77734E-08 | 2.77734E-08 |
| NNA | Quade | 1.57469E-02 | 5.58419E-02 | 4.90027E-02 | 5.44965E-02 |
| WW | Friedman | 1.02474E-13 | 2.11831E-13 | 2.02505E-13 | 2.11831E-13 |
| WW | Friedman Aligned | 1.49597E-12 | 4.60298E-12 | 4.60298E-12 | 4.60298E-12 |
| WW | Quade | 1.57469E-02 | 4.87185E-02 | 4.48837E-02 | 4.76642E-02 |
| CWOA | Friedman | 5.07213E-13 | 1.91180E-12 | 1.91180E-12 | 1.91180E-12 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.57469E-02 | 4.87185E-02 | 4.48837E-02 | 4.76642E-02 |
| IJAYA | Friedman | 1.45953E-12 | 5.38902E-12 | 5.23359E-12 | 5.38902E-12 |
| IJAYA | Friedman Aligned | 2.25780E-09 | 8.51019E-09 | 8.51019E-09 | 8.51019E-09 |
| IJAYA | Quade | 1.49333E-02 | 2.77449E-02 | 2.77449E-02 | 2.73948E-02 |
| **Table S53** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.51193E-12 | 5.38902E-12 | 5.23359E-12 | 5.38902E-12 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 1.51015E-02 | 3.85593E-02 | 3.85593E-02 | 3.78906E-02 |
| NDE | Friedman | 7.43248E-11 | 2.28692E-10 | 2.28692E-10 | 2.28692E-10 |
| NDE | Friedman Aligned | 5.85711E-10 | 2.16263E-09 | 2.16263E-09 | 2.16263E-09 |
| NDE | Quade | 2.70504E-02 | 8.34946E-02 | 8.34946E-02 | 8.09165E-02 |
| TLBO | Friedman | 5.71734E-02 | 1.45785E-01 | 1.45785E-01 | 1.38816E-01 |
| TLBO | Friedman Aligned | 3.82516E-02 | 9.73902E-02 | 9.73902E-02 | 9.42628E-02 |
| TLBO | Quade | 4.94637E-01 | 1.0 | 1.0 | 8.23149E-01 |
| EBLSHADE | Friedman | 7.56821E-01 | 1.0 | 1.0 | 9.26494E-01 |
| EBLSHADE | Friedman Aligned | 3.82635E-01 | 7.18601E-01 | 7.18601E-01 | 5.89504E-01 |
| EBLSHADE | Quade | 8.24330E-01 | 1.0 | 1.0 | 9.59673E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S54.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S54** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S55.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 2.91949E-01 | 3.40696E-01 | 3.40696E-01 | 2.91949E-01 |
| PSO | Friedman Aligned | 5.39802E-08 | 5.39802E-08 | 5.39802E-08 | 5.39802E-08 |
| PSO | Quade | 9.99326E-01 | 1.0 | 1.0 | 9.99326E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 4.13136E-07 | 7.62714E-07 | 7.62714E-07 | 7.62713E-07 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.40272E-02 | 3.58013E-02 | 3.58013E-02 | 3.52243E-02 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 9.38730E-01 | 1.0 | 1.0 | 9.99973E-01 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S55** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 7.29777E-01 | 1.0 | 1.0 | 9.92025E-01 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 7.04009E-01 | 1.0 | 1.0 | 9.85215E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 7.90035E-02 | 2.50048E-01 | 2.50048E-01 | 2.23709E-01 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S56.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.58882E-02 | 3.64967E-02 | 3.64967E-02 | 3.58882E-02 |
| PSO | Friedman Aligned | 2.40712E-09 | 2.40712E-09 | 2.40712E-09 | 2.40712E-09 |
| PSO | Quade | 9.39986E-01 | 1.0 | 1.0 | 9.39986E-01 |
| DE | Friedman | 9.74166E-01 | 1.0 | 1.0 | 9.98829E-01 |
| DE | Friedman Aligned | 2.06881E-05 | 3.81937E-05 | 3.81937E-05 | 3.81931E-05 |
| DE | Quade | 9.97867E-01 | 1.0 | 1.0 | 9.99998E-01 |
| IJAYA | Friedman | 9.74166E-01 | 1.0 | 1.0 | 9.98829E-01 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.97867E-01 | 1.0 | 1.0 | 9.99988E-01 |
| CWOA | Friedman | 9.74166E-01 | 1.0 | 1.0 | 9.99716E-01 |
| CWOA | Friedman Aligned | 3.77795E-01 | 1.0 | 1.0 | 7.67754E-01 |
| CWOA | Quade | 9.97867E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.85128E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 9.96719E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 9.97867E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.85128E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.97867E-01 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S56** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.17077E-01 | 3.11585E-01 | 3.11585E-01 | 2.71001E-01 |
| MABC | Quade | 9.97867E-01 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 9.97867E-01 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S57.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 7.49779E-02 | 7.77045E-02 | 7.77045E-02 | 7.49779E-02 |
| PSO | Friedman Aligned | 1.24163E-09 | 1.24163E-09 | 1.24163E-09 | 1.24163E-09 |
| PSO | Quade | 9.78151E-01 | 1.0 | 1.0 | 9.78151E-01 |
| DE | Friedman | 9.96576E-01 | 1.0 | 1.0 | 9.99972E-01 |
| DE | Friedman Aligned | 4.03245E-05 | 7.44465E-05 | 7.44465E-05 | 7.44440E-05 |
| DE | Quade | 9.99784E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 9.96576E-01 | 1.0 | 1.0 | 9.99972E-01 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.99784E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.96576E-01 | 1.0 | 1.0 | 9.99998E-01 |
| CWOA | Friedman Aligned | 4.67657E-01 | 1.0 | 1.0 | 8.56281E-01 |
| CWOA | Quade | 9.99784E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.99994E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 9.99784E-01 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S57** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.62259E-01 | 4.40367E-01 | 4.40367E-01 | 3.62005E-01 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S58.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.92232E-01 | 2.11737E-01 | 2.11737E-01 | 1.92232E-01 |
| PSO | Friedman Aligned | 3.20410E-13 | 3.20410E-13 | 3.20410E-13 | 3.20410E-13 |
| PSO | Quade | 9.91529E-01 | 1.0 | 1.0 | 9.91529E-01 |
| DE | Friedman | 9.99993E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 9.96242E-03 | 1.84702E-02 | 1.84702E-02 | 1.83146E-02 |
| DE | Quade | 9.99984E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 9.99993E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 9.99984E-01 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 9.42723E-01 | 1.0 | 1.0 | 9.99297E-01 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S58** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S59.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *I*02 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 7.76548E-02 | 8.05850E-02 | 8.05850E-02 | 7.76548E-02 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 9.90947E-01 | 1.0 | 1.0 | 9.90947E-01 |
| DE | Friedman | 9.96991E-01 | 1.0 | 1.0 | 9.99978E-01 |
| DE | Friedman Aligned | 2.24129E-10 | 5.68944E-10 | 5.68944E-10 | 5.68944E-10 |
| DE | Quade | 9.99980E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 9.96991E-01 | 1.0 | 1.0 | 9.99978E-01 |
| IJAYA | Friedman Aligned | 2.35391E-04 | 8.69175E-04 | 8.69175E-04 | 8.68860E-04 |
| IJAYA | Quade | 9.99980E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.96991E-01 | 1.0 | 1.0 | 9.99998E-01 |
| CWOA | Friedman Aligned | 5.19146E-09 | 1.59737E-08 | 1.59737E-08 | 1.59737E-08 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 3.36136E-01 | 1.0 | 1.0 | 7.57830E-01 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.10441E-10 | 2.03890E-10 | 2.03890E-10 | 2.03890E-10 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S59** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 8.28991E-05 | 3.12472E-04 | 3.12472E-04 | 3.12430E-04 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.16470E-05 | 4.30045E-05 | 4.30045E-05 | 4.30037E-05 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 7.14139E-06 | 2.47202E-05 | 2.47202E-05 | 2.47200E-05 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S60.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 3.92321E-10 | 3.92321E-10 | 3.92321E-10 | 3.92321E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 2.79373E-01 | 3.23540E-01 | 3.23540E-01 | 2.79373E-01 |
| PSO | Friedman | 2.88559E-05 | 5.32730E-05 | 5.32730E-05 | 5.32717E-05 |
| PSO | Friedman Aligned | 1.74677E-10 | 6.44961E-10 | 6.44961E-10 | 6.44961E-10 |
| PSO | Quade | 5.37934E-01 | 1.0 | 1.0 | 7.59568E-01 |
| CWOA | Friedman | 2.43825E-04 | 6.18999E-04 | 6.18999E-04 | 6.18825E-04 |
| CWOA | Friedman Aligned | 7.59015E-11 | 2.62736E-10 | 2.62736E-10 | 2.62736E-10 |
| CWOA | Quade | 5.65449E-01 | 1.0 | 1.0 | 8.79446E-01 |
| NNA | Friedman | 6.24368E-04 | 1.92155E-03 | 1.92155E-03 | 1.91989E-03 |
| NNA | Friedman Aligned | 3.95173E-11 | 1.21592E-10 | 1.21592E-10 | 1.21592E-10 |
| NNA | Quade | 5.65449E-01 | 1.0 | 1.0 | 9.06685E-01 |
| GOTLBO | Friedman | 2.71581E-02 | 9.48059E-02 | 9.48059E-02 | 9.09078E-02 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 7.47711E-01 | 1.0 | 1.0 | 9.91495E-01 |
| ISCA | Friedman | 1.51455E-01 | 5.83984E-01 | 5.83984E-01 | 4.54688E-01 |
| ISCA | Friedman Aligned | 4.49465E-10 | 1.69414E-09 | 1.69414E-09 | 1.69414E-09 |
| ISCA | Quade | 8.49293E-01 | 1.0 | 1.0 | 9.99077E-01 |
| MABC | Friedman | 7.73122E-01 | 1.0 | 1.0 | 9.96269E-01 |
| MABC | Friedman Aligned | 1.26240E-12 | 3.20455E-12 | 3.20455E-12 | 3.20455E-12 |
| MABC | Quade | 9.33013E-01 | 1.0 | 1.0 | 9.99962E-01 |
| IJAYA | Friedman | 9.84761E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 8.57775E-01 | 1.0 | 1.0 | 9.99254E-01 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S60** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S61.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 1.36721E-03 | 2.52555E-03 | 2.52555E-03 | 2.52263E-03 |
| ISCA | Friedman | 1.78968E-13 | 3.30402E-13 | 3.30402E-13 | 3.30402E-13 |
| ISCA | Friedman Aligned | 1.55372E-10 | 5.73682E-10 | 5.73682E-10 | 5.73682E-10 |
| ISCA | Quade | 1.65281E-02 | 6.13009E-02 | 6.13009E-02 | 5.96818E-02 |
| GOTLBO | Friedman | 1.95883E-11 | 4.97242E-11 | 4.97242E-11 | 4.97242E-11 |
| GOTLBO | Friedman Aligned | 2.08030E-10 | 7.84112E-10 | 7.84112E-10 | 7.84112E-10 |
| GOTLBO | Quade | 8.54988E-03 | 2.96740E-02 | 2.96740E-02 | 2.92856E-02 |
| MABC | Friedman | 3.70161E-11 | 1.13896E-10 | 1.13896E-10 | 1.13896E-10 |
| MABC | Friedman Aligned | 4.17948E-11 | 1.28599E-10 | 1.28599E-10 | 1.28599E-10 |
| MABC | Quade | 2.91472E-02 | 1.10612E-01 | 1.10612E-01 | 1.05504E-01 |
| IJAYA | Friedman | 8.24453E-10 | 2.85388E-09 | 2.85388E-09 | 2.85388E-09 |
| IJAYA | Friedman Aligned | 2.11001E-09 | 7.30389E-09 | 7.30389E-09 | 7.30389E-09 |
| IJAYA | Quade | 5.50979E-02 | 2.05651E-01 | 1.80331E-01 | 1.88814E-01 |
| DE | Friedman | 1.26059E-09 | 4.65450E-09 | 4.65450E-09 | 4.65450E-09 |
| DE | Friedman Aligned | 9.99304E-10 | 3.68974E-09 | 3.68974E-09 | 3.68974E-09 |
| DE | Quade | 5.50979E-02 | 2.05651E-01 | 1.80331E-01 | 1.88814E-01 |
| NNA | Friedman | 2.52900E-09 | 9.53238E-09 | 9.53238E-09 | 9.53238E-09 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 2.46551E-03 | 7.59267E-03 | 7.59267E-03 | 7.56678E-03 |
| CWOA | Friedman | 7.00046E-09 | 2.58479E-08 | 2.31404E-08 | 2.58479E-08 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 2.22641E-03 | 5.65651E-03 | 5.65651E-03 | 5.64199E-03 |
| **Table S61** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 7.00046E-09 | 2.58479E-08 | 2.31404E-08 | 2.58479E-08 |
| WW | Friedman Aligned | 1.32567E-10 | 4.58885E-10 | 4.58885E-10 | 4.58885E-10 |
| WW | Quade | 1.69100E-04 | 1.69113E-04 | 1.69113E-04 | 1.69100E-04 |
| NDE | Friedman | 1.47046E-04 | 4.52458E-04 | 4.52458E-04 | 4.52382E-04 |
| NDE | Friedman Aligned | 6.50237E-07 | 2.00073E-06 | 2.00073E-06 | 2.00073E-06 |
| NDE | Quade | 2.62860E-01 | 8.36446E-01 | 8.36446E-01 | 6.08744E-01 |
| TLBO | Friedman | 1.57702E-01 | 4.05499E-01 | 4.05499E-01 | 3.53159E-01 |
| TLBO | Friedman Aligned | 4.66638E-01 | 1.0 | 1.0 | 7.97205E-01 |
| TLBO | Quade | 7.20268E-01 | 1.0 | 1.0 | 9.60593E-01 |
| STLBO | Friedman | 9.63022E-01 | 1.0 | 1.0 | 9.97729E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 9.70725E-01 | 1.0 | 1.0 | 9.98525E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S62.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 1.08556E-03 | 2.00503E-03 | 2.00503E-03 | 2.00319E-03 |
| ISCA | Friedman | 4.21441E-13 | 7.78044E-13 | 7.78044E-13 | 7.78044E-13 |
| ISCA | Friedman Aligned | 1.77441E-10 | 6.55168E-10 | 6.55168E-10 | 6.55168E-10 |
| ISCA | Quade | 1.38937E-02 | 5.14932E-02 | 5.14932E-02 | 5.03480E-02 |
| MABC | Friedman | 2.15926E-11 | 5.48119E-11 | 5.48119E-11 | 5.48119E-11 |
| MABC | Friedman Aligned | 5.46148E-11 | 1.68046E-10 | 1.68046E-10 | 1.68046E-10 |
| MABC | Quade | 2.48402E-02 | 9.41718E-02 | 9.41718E-02 | 9.04551E-02 |
| GOTLBO | Friedman | 2.92194E-11 | 8.99059E-11 | 8.99059E-11 | 8.99059E-11 |
| GOTLBO | Friedman Aligned | 1.87348E-10 | 7.06158E-10 | 7.06158E-10 | 7.06158E-10 |
| GOTLBO | Quade | 7.08114E-03 | 2.45652E-02 | 2.45652E-02 | 2.42987E-02 |
| IJAYA | Friedman | 3.81470E-10 | 1.32047E-09 | 1.32047E-09 | 1.32047E-09 |
| IJAYA | Friedman Aligned | 5.75403E-09 | 1.99178E-08 | 1.99178E-08 | 1.99178E-08 |
| IJAYA | Quade | 4.77133E-02 | 1.77825E-01 | 1.56099E-01 | 1.65159E-01 |
| DE | Friedman | 5.89532E-10 | 2.17673E-09 | 2.17673E-09 | 2.17673E-09 |
| DE | Friedman Aligned | 3.00876E-09 | 1.11092E-08 | 1.11092E-08 | 1.11092E-08 |
| DE | Quade | 4.77133E-02 | 1.77825E-01 | 1.56099E-01 | 1.65159E-01 |
| NNA | Friedman | 4.05858E-09 | 1.52977E-08 | 1.52977E-08 | 1.52977E-08 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.99442E-03 | 6.14092E-03 | 6.14092E-03 | 6.12398E-03 |
| WW | Friedman | 9.35983E-09 | 3.45594E-08 | 3.32115E-08 | 3.45594E-08 |
| WW | Friedman Aligned | 1.45939E-10 | 5.05172E-10 | 5.05172E-10 | 5.05172E-10 |
| WW | Quade | 1.29473E-04 | 1.29480E-04 | 1.29480E-04 | 1.29473E-04 |
| **Table S62** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 9.59443E-09 | 3.45594E-08 | 3.32115E-08 | 3.45594E-08 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.79060E-03 | 4.54851E-03 | 4.54851E-03 | 4.53912E-03 |
| NDE | Friedman | 8.95473E-05 | 2.75533E-04 | 2.75533E-04 | 2.75505E-04 |
| NDE | Friedman Aligned | 4.36010E-08 | 1.34157E-07 | 1.34157E-07 | 1.34157E-07 |
| NDE | Quade | 2.38174E-01 | 7.55260E-01 | 7.55260E-01 | 5.67008E-01 |
| TLBO | Friedman | 1.24750E-01 | 3.19870E-01 | 3.19870E-01 | 2.86976E-01 |
| TLBO | Friedman Aligned | 2.17176E-01 | 5.61378E-01 | 5.61378E-01 | 4.62882E-01 |
| TLBO | Quade | 6.79515E-01 | 1.0 | 9.53684E-01 | 9.44344E-01 |
| STLBO | Friedman | 8.79054E-01 | 1.0 | 9.04861E-01 | 9.79755E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 9.31129E-01 | 1.0 | 9.53684E-01 | 9.92841E-01 |
| EBLSHADE | Friedman | 9.04861E-01 | 1.0 | 9.04861E-01 | 9.79755E-01 |
| EBLSHADE | Friedman Aligned | 6.46794E-01 | 1.0 | 1.0 | 8.53584E-01 |
| EBLSHADE | Quade | 9.53684E-01 | 1.0 | 9.53684E-01 | 9.92841E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S63.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 5.95906E-11 | 5.95906E-11 | 5.95906E-11 | 5.95906E-11 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 8.92612E-02 | 1.71378E-01 | 1.71378E-01 | 1.58537E-01 |
| WW | Friedman | 1.13108E-10 | 2.08814E-10 | 2.08814E-10 | 2.08814E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 2.45418E-02 | 2.48242E-02 | 2.48242E-02 | 2.45418E-02 |
| CWOA | Friedman | 8.66736E-10 | 2.20018E-09 | 2.20018E-09 | 2.20018E-09 |
| CWOA | Friedman Aligned | 1.27564E-10 | 4.71006E-10 | 4.71006E-10 | 4.71006E-10 |
| CWOA | Quade | 1.10293E-01 | 2.92688E-01 | 2.92688E-01 | 2.56697E-01 |
| NNA | Friedman | 4.29575E-09 | 1.32177E-08 | 1.32177E-08 | 1.32177E-08 |
| NNA | Friedman Aligned | 1.65481E-10 | 5.72820E-10 | 5.72820E-10 | 5.72820E-10 |
| NNA | Quade | 1.10293E-01 | 3.47534E-01 | 3.47534E-01 | 2.97926E-01 |
| GOTLBO | Friedman | 2.48635E-06 | 8.60661E-06 | 8.60661E-06 | 8.60658E-06 |
| GOTLBO | Friedman Aligned | 7.60474E-11 | 2.86640E-10 | 2.86640E-10 | 2.86640E-10 |
| GOTLBO | Quade | 2.22940E-01 | 8.32115E-01 | 8.32115E-01 | 5.82358E-01 |
| ISCA | Friedman | 7.67415E-05 | 2.83359E-04 | 2.83359E-04 | 2.83324E-04 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 3.11725E-01 | 1.0 | 1.0 | 7.48251E-01 |
| MABC | Friedman | 6.08165E-03 | 2.29554E-02 | 2.29554E-02 | 2.27308E-02 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 4.09668E-01 | 1.0 | 1.0 | 8.62846E-01 |
| IJAYA | Friedman | 2.38708E-02 | 8.85474E-02 | 8.85474E-02 | 8.53440E-02 |
| IJAYA | Friedman Aligned | 1.19504E-12 | 4.13669E-12 | 4.13669E-12 | 4.13669E-12 |
| IJAYA | Quade | 5.51337E-01 | 1.0 | 1.0 | 9.48146E-01 |
| **Table S63** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 2.75393E-02 | 9.57372E-02 | 9.57372E-02 | 9.21405E-02 |
| DE | Friedman Aligned | 1.55452E-11 | 5.73976E-11 | 5.73976E-11 | 5.73976E-11 |
| DE | Quade | 5.51337E-01 | 1.0 | 1.0 | 9.48146E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S64.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.84990E-08 | 1.84990E-08 | 1.84990E-08 | 1.84990E-08 |
| WW | Friedman Aligned | 2.64637E-10 | 8.14269E-10 | 8.14269E-10 | 8.14269E-10 |
| WW | Quade | 4.97749E-01 | 6.70733E-01 | 6.70733E-01 | 4.97749E-01 |
| PSO | Friedman | 4.25680E-04 | 7.86013E-04 | 7.86013E-04 | 7.85730E-04 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 7.58062E-01 | 1.0 | 1.0 | 9.27185E-01 |
| CWOA | Friedman | 2.60995E-03 | 6.63191E-03 | 6.63191E-03 | 6.61195E-03 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 7.72259E-01 | 1.0 | 1.0 | 9.76617E-01 |
| NNA | Friedman | 5.64123E-03 | 1.73916E-02 | 1.73916E-02 | 1.72562E-02 |
| NNA | Friedman Aligned | 1.26098E-09 | 4.36494E-09 | 4.36494E-09 | 4.36494E-09 |
| NNA | Quade | 7.72259E-01 | 1.0 | 1.0 | 9.84364E-01 |
| GOTLBO | Friedman | 1.24793E-01 | 4.49778E-01 | 4.49778E-01 | 3.69603E-01 |
| GOTLBO | Friedman Aligned | 2.57868E-13 | 6.54587E-13 | 6.54587E-13 | 6.54587E-13 |
| GOTLBO | Quade | 9.07365E-01 | 1.0 | 1.0 | 9.99735E-01 |
| ISCA | Friedman | 4.35559E-01 | 1.0 | 1.0 | 8.78968E-01 |
| ISCA | Friedman Aligned | 5.82208E-05 | 2.14973E-04 | 2.14973E-04 | 2.14952E-04 |
| ISCA | Quade | 9.69469E-01 | 1.0 | 1.0 | 9.99997E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S64** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S65.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 5.46141E-12 | 5.46141E-12 | 5.46141E-12 | 5.46141E-12 |
| GOTLBO | Friedman Aligned | 1.85656E-10 | 6.85500E-10 | 6.85500E-10 | 6.85500E-10 |
| GOTLBO | Quade | 3.21257E-02 | 1.12323E-01 | 1.12323E-01 | 1.06876E-01 |
| NNA | Friedman | 5.46141E-12 | 7.30616E-12 | 7.30616E-12 | 7.30616E-12 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.10836E-02 | 3.42350E-02 | 3.42350E-02 | 3.37124E-02 |
| CWOA | Friedman | 1.70145E-11 | 4.31906E-11 | 4.31906E-11 | 4.31906E-11 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.04534E-02 | 2.66429E-02 | 2.66429E-02 | 2.63226E-02 |
| PSO | Friedman | 2.64060E-10 | 8.12492E-10 | 7.63813E-10 | 8.12492E-10 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 7.07405E-03 | 1.30990E-02 | 1.30990E-02 | 1.30207E-02 |
| ISCA | Friedman | 2.64060E-10 | 8.12492E-10 | 7.63813E-10 | 8.12492E-10 |
| ISCA | Friedman Aligned | 1.03659E-10 | 3.90714E-10 | 3.90714E-10 | 3.90714E-10 |
| ISCA | Quade | 5.54732E-02 | 2.07973E-01 | 2.07973E-01 | 1.90003E-01 |
| WW | Friedman | 3.54090E-10 | 1.30741E-09 | 1.30741E-09 | 1.30741E-09 |
| WW | Friedman Aligned | 9.35998E-11 | 3.45599E-10 | 3.45599E-10 | 3.45599E-10 |
| WW | Quade | 1.15226E-03 | 1.15287E-03 | 1.15287E-03 | 1.15226E-03 |
| MABC | Friedman | 2.07209E-07 | 7.81020E-07 | 7.81020E-07 | 7.81020E-07 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 8.81588E-02 | 3.39358E-01 | 3.39358E-01 | 2.93802E-01 |
| IJAYA | Friedman | 2.51710E-06 | 9.29391E-06 | 9.29391E-06 | 9.29387E-06 |
| IJAYA | Friedman Aligned | 3.03666E-10 | 1.05115E-09 | 1.05115E-09 | 1.05115E-09 |
| IJAYA | Quade | 1.47660E-01 | 5.61846E-01 | 4.88755E-01 | 4.45628E-01 |
| **Table S65** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 3.59231E-06 | 1.24349E-05 | 1.24349E-05 | 1.24349E-05 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 1.47660E-01 | 5.61846E-01 | 4.88755E-01 | 4.45628E-01 |
| NDE | Friedman | 2.32779E-02 | 7.18185E-02 | 7.18185E-02 | 6.99073E-02 |
| NDE | Friedman Aligned | 3.36822E-05 | 1.03638E-04 | 1.03638E-04 | 1.03634E-04 |
| NDE | Quade | 5.01560E-01 | 1.0 | 1.0 | 8.82625E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S66.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 5.37814E-04 | 5.37948E-04 | 5.37948E-04 | 5.37814E-04 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 8.88379E-01 | 1.0 | 1.0 | 8.88379E-01 |
| PSO | Friedman | 2.44230E-01 | 5.05979E-01 | 5.05979E-01 | 4.03667E-01 |
| PSO | Friedman Aligned | 1.12035E-10 | 2.06835E-10 | 2.06835E-10 | 2.06835E-10 |
| PSO | Quade | 9.77652E-01 | 1.0 | 1.0 | 9.99104E-01 |
| CWOA | Friedman | 4.83801E-01 | 1.0 | 1.0 | 8.13363E-01 |
| CWOA | Friedman Aligned | 7.28206E-09 | 1.84852E-08 | 1.84852E-08 | 1.84852E-08 |
| CWOA | Quade | 9.79642E-01 | 1.0 | 1.0 | 9.99949E-01 |
| NNA | Friedman | 5.92700E-01 | 1.0 | 1.0 | 9.36943E-01 |
| NNA | Friedman Aligned | 6.56552E-05 | 2.02020E-04 | 2.02020E-04 | 2.02002E-04 |
| NNA | Quade | 9.79642E-01 | 1.0 | 1.0 | 9.99984E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S66** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S67.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 1.65138E-03 | 3.05083E-03 | 3.05083E-03 | 3.04656E-03 |
| ISCA | Friedman | 1.24123E-13 | 2.29150E-13 | 2.29150E-13 | 2.29150E-13 |
| ISCA | Friedman Aligned | 1.77441E-10 | 6.55168E-10 | 6.55168E-10 | 6.55168E-10 |
| ISCA | Quade | 1.90410E-02 | 7.06693E-02 | 7.06693E-02 | 6.85226E-02 |
| GOTLBO | Friedman | 1.37420E-11 | 3.48837E-11 | 3.48837E-11 | 3.48837E-11 |
| GOTLBO | Friedman Aligned | 1.87348E-10 | 7.06158E-10 | 7.06158E-10 | 7.06158E-10 |
| GOTLBO | Quade | 9.97190E-03 | 3.46246E-02 | 3.46246E-02 | 3.40965E-02 |
| MABC | Friedman | 5.56843E-11 | 1.71336E-10 | 1.71336E-10 | 1.71336E-10 |
| MABC | Friedman Aligned | 5.46148E-11 | 1.68046E-10 | 1.68046E-10 | 1.68046E-10 |
| MABC | Quade | 3.31985E-02 | 1.26107E-01 | 1.26107E-01 | 1.19493E-01 |
| IJAYA | Friedman | 1.20599E-09 | 4.17460E-09 | 4.17460E-09 | 4.17460E-09 |
| IJAYA | Friedman Aligned | 5.75403E-09 | 1.99178E-08 | 1.99178E-08 | 1.99178E-08 |
| IJAYA | Quade | 6.19298E-02 | 2.31468E-01 | 2.02790E-01 | 2.10260E-01 |
| DE | Friedman | 1.83414E-09 | 6.77223E-09 | 6.77223E-09 | 6.77223E-09 |
| DE | Friedman Aligned | 3.00876E-09 | 1.11092E-08 | 1.11092E-08 | 1.11092E-08 |
| DE | Quade | 6.19298E-02 | 2.31468E-01 | 2.02790E-01 | 2.10260E-01 |
| NNA | Friedman | 1.98348E-09 | 7.47618E-09 | 7.47618E-09 | 7.47618E-09 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 2.93233E-03 | 9.03172E-03 | 9.03172E-03 | 8.99510E-03 |
| CWOA | Friedman | 5.60543E-09 | 2.06970E-08 | 2.06949E-08 | 2.06970E-08 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 2.66069E-03 | 6.76098E-03 | 6.76098E-03 | 6.74024E-03 |
| **Table S67** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 5.97853E-09 | 2.06970E-08 | 2.06949E-08 | 2.06970E-08 |
| WW | Friedman Aligned | 1.45939E-10 | 5.05172E-10 | 5.05172E-10 | 5.05172E-10 |
| WW | Quade | 2.10491E-04 | 2.10511E-04 | 2.10511E-04 | 2.10491E-04 |
| NDE | Friedman | 1.87474E-04 | 5.76856E-04 | 5.76856E-04 | 5.76731E-04 |
| NDE | Friedman Aligned | 4.36010E-08 | 1.34157E-07 | 1.34157E-07 | 1.34157E-07 |
| NDE | Quade | 2.84587E-01 | 9.08417E-01 | 9.08417E-01 | 6.43152E-01 |
| TLBO | Friedman | 1.76463E-01 | 4.54482E-01 | 4.54482E-01 | 3.89108E-01 |
| TLBO | Friedman Aligned | 2.17176E-01 | 5.61378E-01 | 5.61378E-01 | 4.62882E-01 |
| TLBO | Quade | 7.54166E-01 | 1.0 | 1.0 | 9.71610E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 6.46794E-01 | 1.0 | 1.0 | 8.53584E-01 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S68.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 4.01067E-01 | 5.02631E-01 | 5.02631E-01 | 4.01067E-01 |
| WW | Friedman Aligned | 2.83462E-12 | 2.83462E-12 | 2.83462E-12 | 2.83462E-12 |
| WW | Quade | 9.99914E-01 | 1.0 | 1.0 | 9.99914E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S68** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S69.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 7.43248E-10 | 7.43248E-10 | 7.43248E-10 | 7.43248E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 2.66782E-01 | 3.06638E-01 | 3.06638E-01 | 2.66782E-01 |
| PSO | Friedman | 4.54207E-05 | 8.38553E-05 | 8.38553E-05 | 8.38520E-05 |
| PSO | Friedman Aligned | 1.35070E-10 | 5.09112E-10 | 5.09112E-10 | 5.09112E-10 |
| PSO | Quade | 5.22216E-01 | 1.0 | 1.0 | 7.44252E-01 |
| CWOA | Friedman | 3.64540E-04 | 9.25501E-04 | 9.25501E-04 | 9.25112E-04 |
| CWOA | Friedman Aligned | 5.32651E-11 | 1.96671E-10 | 1.96671E-10 | 1.96671E-10 |
| CWOA | Quade | 5.50483E-01 | 1.0 | 1.0 | 8.68626E-01 |
| NNA | Friedman | 9.08440E-04 | 2.79608E-03 | 2.79608E-03 | 2.79256E-03 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 5.50483E-01 | 1.0 | 1.0 | 8.97503E-01 |
| GOTLBO | Friedman | 3.55101E-02 | 1.24289E-01 | 1.24289E-01 | 1.17640E-01 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 7.34526E-01 | 1.0 | 1.0 | 9.89856E-01 |
| ISCA | Friedman | 1.84143E-01 | 7.17234E-01 | 7.17234E-01 | 5.28316E-01 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 8.38066E-01 | 1.0 | 1.0 | 9.98796E-01 |
| MABC | Friedman | 8.30669E-01 | 1.0 | 1.0 | 9.98761E-01 |
| MABC | Friedman Aligned | 1.20936E-11 | 4.18625E-11 | 4.18625E-11 | 4.18625E-11 |
| MABC | Quade | 9.24393E-01 | 1.0 | 1.0 | 9.99941E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 9.98735E-01 | 1.0 | 1.0 | 1.0 |
| **Table S69** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S70.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.49117E-05 | 1.49118E-05 | 1.49118E-05 | 1.49117E-05 |
| WW | Friedman Aligned | 1.07945E-10 | 1.99283E-10 | 1.99283E-10 | 1.99283E-10 |
| WW | Quade | 7.08152E-01 | 1.0 | 1.0 | 7.08152E-01 |
| PSO | Friedman | 3.30715E-02 | 6.19271E-02 | 6.19271E-02 | 6.01993E-02 |
| PSO | Friedman Aligned | 5.28264E-09 | 1.62543E-08 | 1.62543E-08 | 1.62543E-08 |
| PSO | Quade | 9.00243E-01 | 1.0 | 1.0 | 9.85813E-01 |
| CWOA | Friedman | 1.05547E-01 | 2.79535E-01 | 2.79535E-01 | 2.46592E-01 |
| CWOA | Friedman Aligned | 4.87572E-10 | 1.23768E-09 | 1.23768E-09 | 1.23768E-09 |
| CWOA | Quade | 9.05533E-01 | 1.0 | 1.0 | 9.97495E-01 |
| NNA | Friedman | 1.61730E-01 | 5.28346E-01 | 5.28346E-01 | 4.18890E-01 |
| NNA | Friedman Aligned | 4.82059E-13 | 4.82059E-13 | 4.82059E-13 | 4.82059E-13 |
| NNA | Quade | 9.05533E-01 | 1.0 | 1.0 | 9.98649E-01 |
| GOTLBO | Friedman | 7.82941E-01 | 1.0 | 1.0 | 9.94947E-01 |
| GOTLBO | Friedman Aligned | 2.23133E-03 | 7.72913E-03 | 7.72913E-03 | 7.70263E-03 |
| GOTLBO | Quade | 9.81758E-01 | 1.0 | 1.0 | 9.99999E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S70** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S71.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 4.34105E-02 | 4.43053E-02 | 4.43053E-02 | 4.34105E-02 |
| WW | Friedman Aligned | 1.25781E-08 | 1.25781E-08 | 1.25781E-08 | 1.25781E-08 |
| WW | Quade | 9.93459E-01 | 1.0 | 1.0 | 9.93459E-01 |
| PSO | Friedman | 9.59537E-01 | 1.0 | 1.0 | 9.97318E-01 |
| PSO | Friedman Aligned | 1.41924E-05 | 2.62016E-05 | 2.62016E-05 | 2.62013E-05 |
| PSO | Quade | 9.99820E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.98121E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 2.92359E-01 | 8.43733E-01 | 8.43733E-01 | 5.84323E-01 |
| CWOA | Quade | 9.99978E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S71** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S72.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.05634E-01 | 1.11163E-01 | 1.11163E-01 | 1.05634E-01 |
| WW | Friedman Aligned | 7.79425E-08 | 7.79425E-08 | 7.79425E-08 | 7.79425E-08 |
| WW | Quade | 9.97790E-01 | 1.0 | 1.0 | 9.97790E-01 |
| PSO | Friedman | 9.96116E-01 | 1.0 | 1.0 | 9.99965E-01 |
| PSO | Friedman Aligned | 1.94787E-02 | 3.62606E-02 | 3.62606E-02 | 3.56640E-02 |
| PSO | Quade | 9.99983E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S72** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S73.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *n*2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S73** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S74.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.85241E-05 | 3.85248E-05 | 3.85248E-05 | 3.85241E-05 |
| PSO | Friedman Aligned | 1.30970E-08 | 3.32462E-08 | 3.16401E-08 | 3.32462E-08 |
| PSO | Quade | 6.28939E-01 | 9.54531E-01 | 9.54531E-01 | 6.28939E-01 |
| CWOA | Friedman | 2.30207E-04 | 4.25038E-04 | 4.25038E-04 | 4.24956E-04 |
| CWOA | Friedman Aligned | 1.45657E-11 | 1.45657E-11 | 1.45657E-11 | 1.45657E-11 |
| CWOA | Quade | 6.36202E-01 | 1.0 | 1.0 | 8.45375E-01 |
| WW | Friedman | 5.14600E-04 | 1.30655E-03 | 1.30655E-03 | 1.30577E-03 |
| WW | Friedman Aligned | 1.30970E-08 | 3.32462E-08 | 3.16401E-08 | 3.32462E-08 |
| WW | Quade | 6.36202E-01 | 1.0 | 1.0 | 8.93749E-01 |
| MABC | Friedman | 9.08440E-04 | 2.79608E-03 | 2.79608E-03 | 2.79256E-03 |
| MABC | Friedman Aligned | 8.90533E-10 | 1.64406E-09 | 1.64406E-09 | 1.64406E-09 |
| MABC | Quade | 6.36202E-01 | 1.0 | 1.0 | 8.93749E-01 |
| NNA | Friedman | 3.83377E-03 | 1.32864E-02 | 1.32864E-02 | 1.32082E-02 |
| NNA | Friedman Aligned | 8.30815E-06 | 3.06763E-05 | 3.06763E-05 | 3.06759E-05 |
| NNA | Quade | 6.84588E-01 | 1.0 | 1.0 | 9.81577E-01 |
| GOTLBO | Friedman | 9.97395E-03 | 3.69263E-02 | 3.69263E-02 | 3.63352E-02 |
| GOTLBO | Friedman Aligned | 1.25934E-03 | 4.74813E-03 | 4.74813E-03 | 4.73848E-03 |
| GOTLBO | Quade | 6.84588E-01 | 1.0 | 1.0 | 9.81577E-01 |
| ISCA | Friedman | 2.90759E-02 | 1.10340E-01 | 1.10340E-01 | 1.05257E-01 |
| ISCA | Friedman Aligned | 1.94427E-03 | 7.18153E-03 | 7.18153E-03 | 7.16008E-03 |
| ISCA | Quade | 6.84588E-01 | 1.0 | 1.0 | 9.81577E-01 |
| NDE | Friedman | 3.23617E-01 | 1.0 | 1.0 | 7.63942E-01 |
| NDE | Friedman Aligned | 5.67700E-06 | 1.96512E-05 | 1.96512E-05 | 1.96510E-05 |
| NDE | Quade | 6.84588E-01 | 1.0 | 1.0 | 9.81577E-01 |
| **Table S74** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 8.26099E-01 | 1.0 | 1.0 | 9.97654E-01 |
| IJAYA | Friedman Aligned | 8.17591E-01 | 1.0 | 1.0 | 9.97233E-01 |
| IJAYA | Quade | 9.26311E-01 | 1.0 | 1.0 | 9.99880E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S75.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 2.82885E-13 | 2.82885E-13 | 2.82885E-13 | 2.82885E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 3.19021E-02 | 1.18526E-01 | 1.18526E-01 | 1.12824E-01 |
| GOTLBO | Friedman | 3.53606E-13 | 6.52811E-13 | 6.52811E-13 | 6.52811E-13 |
| GOTLBO | Friedman Aligned | 2.87605E-10 | 1.06193E-09 | 1.06193E-09 | 1.06193E-09 |
| GOTLBO | Quade | 3.16479E-02 | 1.10636E-01 | 1.05998E-01 | 1.05349E-01 |
| NNA | Friedman | 2.63833E-12 | 6.69731E-12 | 6.69731E-12 | 6.69731E-12 |
| NNA | Friedman Aligned | 4.20856E-09 | 1.45681E-08 | 1.45681E-08 | 1.45681E-08 |
| NNA | Quade | 3.16479E-02 | 1.10636E-01 | 1.05998E-01 | 1.05349E-01 |
| MABC | Friedman | 3.12516E-11 | 9.61586E-11 | 9.61586E-11 | 9.61586E-11 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 1.54402E-02 | 3.94292E-02 | 3.94292E-02 | 3.87301E-02 |
| WW | Friedman | 8.01828E-11 | 2.77556E-10 | 2.77556E-10 | 2.77556E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 1.54402E-02 | 4.15868E-02 | 4.15868E-02 | 4.08171E-02 |
| NDE | Friedman | 1.83881E-10 | 6.78945E-10 | 6.78945E-10 | 6.78945E-10 |
| NDE | Friedman Aligned | 4.73813E-09 | 1.45789E-08 | 1.45789E-08 | 1.45789E-08 |
| NDE | Quade | 3.16479E-02 | 1.18446E-01 | 1.18446E-01 | 1.12600E-01 |
| CWOA | Friedman | 2.39580E-10 | 9.03031E-10 | 9.03031E-10 | 9.03031E-10 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.49768E-02 | 2.78262E-02 | 2.78262E-02 | 2.74741E-02 |
| PSO | Friedman | 2.21287E-09 | 8.17061E-09 | 8.17061E-09 | 8.17061E-09 |
| PSO | Friedman Aligned | 4.91679E-11 | 1.85325E-10 | 1.85325E-10 | 1.85325E-10 |
| PSO | Quade | 9.54010E-03 | 9.58237E-03 | 9.58237E-03 | 9.54010E-03 |
| **Table S75** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 2.50012E-08 | 8.65425E-08 | 8.65425E-08 | 8.65425E-08 |
| IJAYA | Friedman Aligned | 9.85286E-13 | 3.63798E-12 | 3.63798E-12 | 3.63798E-12 |
| IJAYA | Quade | 1.03731E-01 | 3.65075E-01 | 3.65075E-01 | 3.15515E-01 |
| DE | Friedman | 1.88313E-07 | 5.79424E-07 | 5.79424E-07 | 5.79424E-07 |
| DE | Friedman Aligned | <1E-13 | 2.51799E-13 | 2.51799E-13 | 2.51799E-13 |
| DE | Quade | 1.44238E-01 | 4.51670E-01 | 4.51670E-01 | 3.80764E-01 |
| TLBO | Friedman | 8.79380E-02 | 2.24791E-01 | 2.24791E-01 | 2.08368E-01 |
| TLBO | Friedman Aligned | 1.36519E-03 | 3.46585E-03 | 3.46585E-03 | 3.46185E-03 |
| TLBO | Quade | 6.31532E-01 | 1.0 | 1.0 | 9.20691E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S76.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 1.54143E-12 | 1.54143E-12 | 1.54143E-12 | 1.54143E-12 |
| ISCA | Friedman Aligned | 6.19721E-09 | 2.14519E-08 | 2.14519E-08 | 2.14519E-08 |
| ISCA | Quade | 1.33574E-02 | 4.94471E-02 | 4.94471E-02 | 4.84395E-02 |
| NDE | Friedman | 1.23935E-11 | 2.57512E-11 | 2.57512E-11 | 2.57512E-11 |
| NDE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NDE | Quade | 1.28596E-02 | 4.86156E-02 | 4.86156E-02 | 4.76143E-02 |
| GOTLBO | Friedman | 1.23935E-11 | 2.28804E-11 | 2.28804E-11 | 2.28804E-11 |
| GOTLBO | Friedman Aligned | 7.46673E-09 | 2.29745E-08 | 2.29745E-08 | 2.29745E-08 |
| GOTLBO | Quade | 1.26457E-02 | 4.39450E-02 | 4.24241E-02 | 4.30964E-02 |
| NNA | Friedman | 4.65187E-11 | 1.43134E-10 | 1.43134E-10 | 1.43134E-10 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.26457E-02 | 4.39450E-02 | 4.24241E-02 | 4.30964E-02 |
| MABC | Friedman | 3.75683E-10 | 1.30044E-09 | 1.30044E-09 | 1.30044E-09 |
| MABC | Friedman Aligned | 2.94570E-11 | 1.01966E-10 | 1.01966E-10 | 1.01966E-10 |
| MABC | Quade | 5.47342E-03 | 1.39234E-02 | 1.39234E-02 | 1.38356E-02 |
| WW | Friedman | 8.36500E-10 | 3.08861E-09 | 3.08861E-09 | 3.08861E-09 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 5.47342E-03 | 1.48853E-02 | 1.48853E-02 | 1.47860E-02 |
| IJAYA | Friedman | 1.35369E-09 | 5.10235E-09 | 5.10235E-09 | 5.10235E-09 |
| IJAYA | Friedman Aligned | 2.63984E-09 | 9.74710E-09 | 9.74710E-09 | 9.74710E-09 |
| IJAYA | Quade | 5.07250E-02 | 1.76988E-01 | 1.76988E-01 | 1.64894E-01 |
| CWOA | Friedman | 2.10865E-09 | 7.78579E-09 | 7.78579E-09 | 7.78579E-09 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 5.10914E-03 | 9.45270E-03 | 9.45270E-03 | 9.41186E-03 |
| **Table S76** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.08138E-08 | 3.74326E-08 | 3.74326E-08 | 3.74326E-08 |
| DE | Friedman Aligned | 5.65963E-10 | 2.13325E-09 | 2.13325E-09 | 2.13325E-09 |
| DE | Quade | 7.46403E-02 | 2.31704E-01 | 2.31704E-01 | 2.12337E-01 |
| PSO | Friedman | 1.25898E-08 | 3.87379E-08 | 3.87379E-08 | 3.87379E-08 |
| PSO | Friedman Aligned | 1.07413E-10 | 3.96600E-10 | 3.96600E-10 | 3.96600E-10 |
| PSO | Quade | 2.95239E-03 | 2.95642E-03 | 2.95642E-03 | 2.95239E-03 |
| TLBO | Friedman | 2.48488E-02 | 6.31994E-02 | 6.31994E-02 | 6.18773E-02 |
| TLBO | Friedman Aligned | 1.59818E-06 | 4.05692E-06 | 4.05692E-06 | 4.05691E-06 |
| TLBO | Quade | 4.31217E-01 | 1.0 | 9.40692E-01 | 7.61251E-01 |
| EBLSHADE | Friedman | 6.28359E-01 | 1.0 | 7.46914E-01 | 8.39165E-01 |
| EBLSHADE | Friedman Aligned | 1.22462E-01 | 2.27198E-01 | 2.27198E-01 | 2.14293E-01 |
| EBLSHADE | Quade | 7.82837E-01 | 1.0 | 9.40692E-01 | 9.40351E-01 |
| STLBO | Friedman | 7.46914E-01 | 1.0 | 7.46914E-01 | 8.39165E-01 |
| STLBO | Friedman Aligned | 9.97806E-01 | 9.97806E-01 | 9.97806E-01 | 9.97806E-01 |
| STLBO | Quade | 9.40692E-01 | 1.0 | 9.40692E-01 | 9.40692E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S77.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 7.80942E-03 | 7.83771E-03 | 7.83771E-03 | 7.80942E-03 |
| PSO | Friedman Aligned | 2.30926E-13 | 2.30926E-13 | 2.30926E-13 | 2.30926E-13 |
| PSO | Quade | 9.93803E-01 | 1.0 | 1.0 | 9.93803E-01 |
| CWOA | Friedman | 2.45863E-02 | 4.58695E-02 | 4.58695E-02 | 4.49174E-02 |
| CWOA | Friedman Aligned | 6.34585E-04 | 1.61126E-03 | 1.61126E-03 | 1.61008E-03 |
| CWOA | Quade | 9.93803E-01 | 1.0 | 1.0 | 9.99812E-01 |
| WW | Friedman | 3.91395E-02 | 1.00885E-01 | 1.00885E-01 | 9.63840E-02 |
| WW | Friedman Aligned | 5.71982E-01 | 1.0 | 1.0 | 9.26542E-01 |
| WW | Quade | 9.93803E-01 | 1.0 | 1.0 | 9.99958E-01 |
| MABC | Friedman | 5.36610E-02 | 1.68274E-01 | 1.68274E-01 | 1.56087E-01 |
| MABC | Friedman Aligned | 1.94364E-05 | 3.58829E-05 | 3.58829E-05 | 3.58823E-05 |
| MABC | Quade | 9.93803E-01 | 1.0 | 1.0 | 9.99958E-01 |
| NNA | Friedman | 1.31625E-01 | 4.75511E-01 | 4.75511E-01 | 3.86475E-01 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 9.97994E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 2.26749E-01 | 8.95302E-01 | 8.95302E-01 | 6.13059E-01 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 9.97994E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 4.01459E-01 | 1.0 | 1.0 | 8.55518E-01 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S77** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S78.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.90021E-01 | 1.0 | 1.0 | 9.90021E-01 |
| PSO | Friedman Aligned | 1.47252E-02 | 1.48262E-02 | 1.48262E-02 | 1.47252E-02 |
| PSO | Quade | 9.99998E-01 | 1.0 | 1.0 | 9.99998E-01 |
| CWOA | Friedman | 9.98002E-01 | 1.0 | 1.0 | 9.99990E-01 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.99533E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S78** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S79.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 4.24327E-13 | 4.24327E-13 | 4.24327E-13 | 4.24327E-13 |
| CWOA | Friedman Aligned | 1.58213E-08 | 5.84171E-08 | 5.84171E-08 | 5.84171E-08 |
| CWOA | Quade | 8.27070E-02 | 1.58322E-01 | 1.58322E-01 | 1.47324E-01 |
| PSO | Friedman | 5.47007E-13 | 1.00986E-12 | 1.00986E-12 | 1.00986E-12 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 6.29272E-02 | 6.48321E-02 | 6.48321E-02 | 6.29272E-02 |
| WW | Friedman | 1.17580E-12 | 2.98472E-12 | 2.98472E-12 | 2.98472E-12 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 8.27070E-02 | 2.15423E-01 | 2.15423E-01 | 1.95696E-01 |
| MABC | Friedman | 4.19564E-12 | 1.29097E-11 | 1.29097E-11 | 1.29097E-11 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 8.27070E-02 | 2.09263E-01 | 2.09263E-01 | 1.90452E-01 |
| NNA | Friedman | 7.84642E-11 | 2.71607E-10 | 2.71607E-10 | 2.71607E-10 |
| NNA | Friedman Aligned | 2.47028E-10 | 9.12102E-10 | 9.12102E-10 | 9.12102E-10 |
| NNA | Quade | 1.31675E-01 | 4.75701E-01 | 4.49624E-01 | 3.86597E-01 |
| GOTLBO | Friedman | 6.36465E-10 | 2.35003E-09 | 2.35003E-09 | 2.35003E-09 |
| GOTLBO | Friedman Aligned | 2.11298E-13 | 7.31415E-13 | 7.31415E-13 | 7.31415E-13 |
| GOTLBO | Quade | 1.31675E-01 | 4.75701E-01 | 4.49624E-01 | 3.86597E-01 |
| ISCA | Friedman | 7.32203E-09 | 2.75984E-08 | 2.75984E-08 | 2.75984E-08 |
| ISCA | Friedman Aligned | <1E-13 | 2.62013E-13 | 2.62013E-13 | 2.62013E-13 |
| ISCA | Quade | 1.31675E-01 | 4.80357E-01 | 4.66941E-01 | 3.92032E-01 |
| NDE | Friedman | 3.81094E-06 | 1.40712E-05 | 1.40712E-05 | 1.40711E-05 |
| NDE | Friedman Aligned | 3.64961E-10 | 1.37562E-09 | 1.37562E-09 | 1.37562E-09 |
| NDE | Quade | 1.31675E-01 | 4.80357E-01 | 4.66941E-01 | 3.92032E-01 |
| **Table S79** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.63384E-04 | 5.65573E-04 | 5.65573E-04 | 5.65445E-04 |
| IJAYA | Friedman Aligned | 3.87465E-07 | 1.34123E-06 | 1.34123E-06 | 1.34123E-06 |
| IJAYA | Quade | 3.02189E-01 | 1.0 | 1.0 | 7.12198E-01 |
| DE | Friedman | 6.56389E-04 | 2.01981E-03 | 2.01981E-03 | 2.01828E-03 |
| DE | Friedman Aligned | 2.66423E-06 | 8.19762E-06 | 8.19762E-06 | 8.19760E-06 |
| DE | Quade | 3.81323E-01 | 1.0 | 1.0 | 7.71781E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S80.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 5.86488E-01 | 8.53743E-01 | 8.53743E-01 | 5.86488E-01 |
| PSO | Friedman Aligned | 8.81758E-10 | 8.81758E-10 | 8.81758E-10 | 8.81758E-10 |
| PSO | Quade | 9.97484E-01 | 1.0 | 1.0 | 9.97484E-01 |
| CWOA | Friedman | 7.51157E-01 | 1.0 | 1.0 | 9.23302E-01 |
| CWOA | Friedman Aligned | 1.22647E-06 | 3.11335E-06 | 3.11335E-06 | 3.11335E-06 |
| CWOA | Quade | 9.97484E-01 | 1.0 | 1.0 | 9.99959E-01 |
| WW | Friedman | 7.99268E-01 | 1.0 | 1.0 | 9.83028E-01 |
| WW | Friedman Aligned | 3.57471E-02 | 1.11380E-01 | 1.11380E-01 | 1.05960E-01 |
| WW | Quade | 9.97484E-01 | 1.0 | 1.0 | 9.99994E-01 |
| MABC | Friedman | 8.32806E-01 | 1.0 | 1.0 | 9.95927E-01 |
| MABC | Friedman Aligned | 1.26421E-08 | 2.33393E-08 | 2.33393E-08 | 2.33393E-08 |
| MABC | Quade | 9.97484E-01 | 1.0 | 1.0 | 9.99994E-01 |
| NNA | Friedman | 9.66409E-01 | 1.0 | 1.0 | 9.99992E-01 |
| NNA | Friedman Aligned | 4.19070E-01 | 1.0 | 1.0 | 8.65391E-01 |
| NNA | Quade | 9.99955E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S80** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 4.05106E-01 | 1.0 | 1.0 | 8.34341E-01 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S81.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 1.84741E-13 | 1.84741E-13 | 1.84741E-13 | 1.84741E-13 |
| ISCA | Friedman Aligned | 6.16534E-09 | 2.13416E-08 | 2.13416E-08 | 2.13416E-08 |
| ISCA | Quade | 1.65864E-02 | 6.14388E-02 | 6.14388E-02 | 5.98873E-02 |
| GOTLBO | Friedman | 1.50679E-12 | 2.78177E-12 | 2.78177E-12 | 2.78177E-12 |
| GOTLBO | Friedman Aligned | 7.42973E-09 | 2.28607E-08 | 2.28607E-08 | 2.28607E-08 |
| GOTLBO | Quade | 1.58830E-02 | 5.52505E-02 | 5.32410E-02 | 5.39130E-02 |
| NNA | Friedman | 9.56997E-12 | 2.42930E-11 | 2.42930E-11 | 2.42930E-11 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.58830E-02 | 5.52505E-02 | 5.32410E-02 | 5.39130E-02 |
| NDE | Friedman | 7.10301E-11 | 2.18554E-10 | 2.18554E-10 | 2.18554E-10 |
| NDE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NDE | Quade | 1.60291E-02 | 6.06427E-02 | 6.06427E-02 | 5.90891E-02 |
| MABC | Friedman | 7.53190E-11 | 2.60719E-10 | 2.60719E-10 | 2.60719E-10 |
| MABC | Friedman Aligned | 2.94091E-11 | 1.01801E-10 | 1.01801E-10 | 1.01801E-10 |
| MABC | Quade | 7.07439E-03 | 1.80071E-02 | 1.80071E-02 | 1.78605E-02 |
| WW | Friedman | 1.86658E-10 | 6.89200E-10 | 6.89200E-10 | 6.89200E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 7.07439E-03 | 1.91887E-02 | 1.91887E-02 | 1.90239E-02 |
| CWOA | Friedman | 6.11462E-10 | 2.30474E-09 | 2.30474E-09 | 2.30474E-09 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 6.66498E-03 | 1.23394E-02 | 1.23394E-02 | 1.22699E-02 |
| PSO | Friedman | 4.89640E-09 | 1.80790E-08 | 1.80790E-08 | 1.80790E-08 |
| PSO | Friedman Aligned | 1.07310E-10 | 3.96220E-10 | 3.96220E-10 | 3.96220E-10 |
| PSO | Quade | 3.94226E-03 | 3.94945E-03 | 3.94945E-03 | 3.94226E-03 |
| **Table S81** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 7.58306E-09 | 2.62490E-08 | 2.62490E-08 | 2.62490E-08 |
| IJAYA | Friedman Aligned | 2.61112E-09 | 9.64106E-09 | 9.64106E-09 | 9.64106E-09 |
| IJAYA | Quade | 6.06906E-02 | 2.12098E-01 | 2.12098E-01 | 1.94851E-01 |
| DE | Friedman | 6.24243E-08 | 1.92075E-07 | 1.92075E-07 | 1.92075E-07 |
| DE | Friedman Aligned | 5.59014E-10 | 2.10705E-09 | 2.10705E-09 | 2.10705E-09 |
| DE | Quade | 8.80902E-02 | 2.73906E-01 | 2.73906E-01 | 2.47035E-01 |
| TLBO | Friedman | 5.55943E-02 | 1.41741E-01 | 1.41741E-01 | 1.35150E-01 |
| TLBO | Friedman Aligned | 1.62041E-06 | 4.11334E-06 | 4.11334E-06 | 4.11334E-06 |
| TLBO | Quade | 4.76082E-01 | 1.0 | 1.0 | 8.06197E-01 |
| EBLSHADE | Friedman | 8.61718E-01 | 1.0 | 1.0 | 9.74075E-01 |
| EBLSHADE | Friedman Aligned | 1.23136E-01 | 2.28456E-01 | 2.28456E-01 | 2.15408E-01 |
| EBLSHADE | Quade | 8.37323E-01 | 1.0 | 1.0 | 9.65006E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S82.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S82** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S83.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 2.31344E-04 | 2.31368E-04 | 2.31368E-04 | 2.31344E-04 |
| PSO | Friedman Aligned | 6.11085E-09 | 1.55122E-08 | 1.55122E-08 | 1.55122E-08 |
| PSO | Quade | 7.91155E-01 | 1.0 | 1.0 | 7.91155E-01 |
| CWOA | Friedman | 1.13512E-03 | 2.09662E-03 | 2.09662E-03 | 2.09461E-03 |
| CWOA | Friedman Aligned | 9.81437E-13 | 9.81437E-13 | 9.81437E-13 | 9.81437E-13 |
| CWOA | Quade | 7.91155E-01 | 1.0 | 1.0 | 9.40998E-01 |
| WW | Friedman | 2.28574E-03 | 5.80737E-03 | 5.80737E-03 | 5.79207E-03 |
| WW | Friedman Aligned | 1.00298E-07 | 3.08611E-07 | 3.08611E-07 | 3.08611E-07 |
| WW | Quade | 7.91155E-01 | 1.0 | 1.0 | 9.65039E-01 |
| MABC | Friedman | 3.73238E-03 | 1.14991E-02 | 1.14991E-02 | 1.14398E-02 |
| MABC | Friedman Aligned | 1.20086E-10 | 2.21697E-10 | 2.21697E-10 | 2.21697E-10 |
| MABC | Quade | 7.91155E-01 | 1.0 | 1.0 | 9.65039E-01 |
| NNA | Friedman | 1.33622E-02 | 4.64453E-02 | 4.64453E-02 | 4.54980E-02 |
| NNA | Friedman Aligned | 5.19667E-05 | 1.91880E-04 | 1.91880E-04 | 1.91864E-04 |
| NNA | Quade | 8.14745E-01 | 1.0 | 1.0 | 9.97080E-01 |
| GOTLBO | Friedman | 3.06760E-02 | 1.14216E-01 | 1.14216E-01 | 1.08668E-01 |
| GOTLBO | Friedman Aligned | 4.97230E-03 | 1.87633E-02 | 1.87633E-02 | 1.86131E-02 |
| GOTLBO | Quade | 8.14745E-01 | 1.0 | 1.0 | 9.97080E-01 |
| ISCA | Friedman | 7.68884E-02 | 2.95155E-01 | 2.95155E-01 | 2.60335E-01 |
| ISCA | Friedman Aligned | 7.23856E-03 | 2.67643E-02 | 2.67643E-02 | 2.64676E-02 |
| ISCA | Quade | 8.14745E-01 | 1.0 | 1.0 | 9.97080E-01 |
| NDE | Friedman | 5.51498E-01 | 1.0 | 1.0 | 9.48214E-01 |
| NDE | Friedman Aligned | 3.71045E-05 | 1.28440E-04 | 1.28440E-04 | 1.28433E-04 |
| NDE | Quade | 8.14745E-01 | 1.0 | 1.0 | 9.97080E-01 |
| **Table S83** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S84.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 2.69676E-01 | 3.10499E-01 | 3.10499E-01 | 2.69676E-01 |
| PSO | Friedman Aligned | 1.90081E-09 | 1.90081E-09 | 1.90081E-09 | 1.90081E-09 |
| PSO | Quade | 9.89623E-01 | 1.0 | 1.0 | 9.89623E-01 |
| CWOA | Friedman | 4.39552E-01 | 1.0 | 1.0 | 6.56634E-01 |
| CWOA | Friedman Aligned | 5.21440E-07 | 1.32366E-06 | 1.32366E-06 | 1.32366E-06 |
| CWOA | Quade | 9.89623E-01 | 1.0 | 1.0 | 9.99557E-01 |
| WW | Friedman | 5.09275E-01 | 1.0 | 1.0 | 8.35864E-01 |
| WW | Friedman Aligned | 2.25658E-02 | 6.99826E-02 | 6.99826E-02 | 6.78193E-02 |
| WW | Quade | 9.89623E-01 | 1.0 | 1.0 | 9.99883E-01 |
| MABC | Friedman | 5.59198E-01 | 1.0 | 1.0 | 9.19580E-01 |
| MABC | Friedman Aligned | 4.73291E-09 | 8.73769E-09 | 8.73769E-09 | 8.73769E-09 |
| MABC | Quade | 9.89623E-01 | 1.0 | 1.0 | 9.99883E-01 |
| NNA | Friedman | 7.82941E-01 | 1.0 | 1.0 | 9.94947E-01 |
| NNA | Friedman Aligned | 3.27655E-01 | 1.0 | 1.0 | 7.69104E-01 |
| NNA | Quade | 9.94298E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 9.12830E-01 | 1.0 | 1.0 | 9.99878E-01 |
| GOTLBO | Friedman Aligned | 9.78655E-01 | 1.0 | 1.0 | 9.99999E-01 |
| GOTLBO | Quade | 9.94298E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S84** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 3.13388E-01 | 1.0 | 1.0 | 7.27874E-01 |
| NDE | Quade | 9.96741E-01 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S85.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 8.48601E-01 | 1.0 | 1.0 | 8.48601E-01 |
| PSO | Friedman Aligned | 4.90719E-13 | 4.90719E-13 | 4.90719E-13 | 4.90719E-13 |
| PSO | Quade | 9.98135E-01 | 1.0 | 1.0 | 9.98135E-01 |
| CWOA | Friedman | 9.32174E-01 | 1.0 | 1.0 | 9.93041E-01 |
| CWOA | Friedman Aligned | 3.95822E-04 | 1.00493E-03 | 1.00493E-03 | 1.00447E-03 |
| CWOA | Quade | 9.98135E-01 | 1.0 | 1.0 | 9.99976E-01 |
| WW | Friedman | 9.51791E-01 | 1.0 | 1.0 | 9.99546E-01 |
| WW | Friedman Aligned | 4.91869E-01 | 1.0 | 1.0 | 8.75460E-01 |
| WW | Quade | 9.98135E-01 | 1.0 | 1.0 | 9.99997E-01 |
| MABC | Friedman | 9.66929E-01 | 1.0 | 1.0 | 9.99972E-01 |
| MABC | Friedman Aligned | 1.10045E-05 | 2.03160E-05 | 2.03160E-05 | 2.03159E-05 |
| MABC | Quade | 9.98135E-01 | 1.0 | 1.0 | 9.99997E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 9.97980E-01 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S85** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S86.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.99991E-01 | 1.0 | 1.0 | 9.99991E-01 |
| PSO | Friedman Aligned | 4.75831E-04 | 4.75935E-04 | 4.75935E-04 | 4.75831E-04 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 9.56126E-01 | 1.0 | 1.0 | 9.96886E-01 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S86** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S87.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *R*p2 evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.98940E-01 | 1.0 | 1.0 | 9.98940E-01 |
| PSO | Friedman Aligned | 2.50197E-10 | 2.50197E-10 | 2.50197E-10 | 2.50197E-10 |
| PSO | Quade | 9.99995E-01 | 1.0 | 1.0 | 9.99995E-01 |
| CWOA | Friedman | 9.99937E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 4.02222E-02 | 1.03720E-01 | 1.03720E-01 | 9.89662E-02 |
| CWOA | Quade | 9.99997E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 3.37036E-03 | 6.23109E-03 | 6.23109E-03 | 6.21332E-03 |
| MABC | Quade | 9.99999E-01 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S87** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S88.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.65316E-06 | 1.65316E-06 | 1.65316E-06 | 1.65316E-06 |
| PSO | Friedman Aligned | 1.53731E-10 | 5.67622E-10 | 5.67622E-10 | 5.67622E-10 |
| PSO | Quade | 3.88398E-01 | 4.82491E-01 | 4.82491E-01 | 3.88398E-01 |
| GOTLBO | Friedman | 8.93210E-06 | 1.64901E-05 | 1.64901E-05 | 1.64900E-05 |
| GOTLBO | Friedman Aligned | 4.73962E-11 | 1.45834E-10 | 1.45834E-10 | 1.45834E-10 |
| GOTLBO | Quade | 4.90459E-01 | 1.0 | 1.0 | 7.11990E-01 |
| CWOA | Friedman | 1.88793E-04 | 4.79278E-04 | 4.79278E-04 | 4.79174E-04 |
| CWOA | Friedman Aligned | 7.33780E-11 | 2.54001E-10 | 2.54001E-10 | 2.54001E-10 |
| CWOA | Quade | 4.90459E-01 | 1.0 | 1.0 | 7.11990E-01 |
| NNA | Friedman | 2.35379E-04 | 7.24303E-04 | 7.24303E-04 | 7.24067E-04 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 4.90459E-01 | 1.0 | 1.0 | 8.02179E-01 |
| ISCA | Friedman | 2.53779E-04 | 8.78536E-04 | 8.78536E-04 | 8.78193E-04 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 4.90459E-01 | 1.0 | 1.0 | 8.02179E-01 |
| WW | Friedman | 2.94224E-03 | 1.08723E-02 | 1.08723E-02 | 1.08207E-02 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 4.90459E-01 | 1.0 | 1.0 | 8.86478E-01 |
| MABC | Friedman | 7.26555E-02 | 2.78617E-01 | 2.78617E-01 | 2.47469E-01 |
| MABC | Friedman Aligned | 6.49287E-08 | 2.44731E-07 | 2.44731E-07 | 2.44731E-07 |
| MABC | Quade | 7.38143E-01 | 1.0 | 1.0 | 9.93595E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S88** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S89.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Friedman Aligned | 1.34914E-10 | 4.67010E-10 | 4.67010E-10 | 4.67010E-10 |
| GOTLBO | Quade | 2.01733E-03 | 3.72749E-03 | 3.62027E-03 | 3.72113E-03 |
| MABC | Friedman | 5.02265E-13 | 9.27258E-13 | 9.27258E-13 | 9.27258E-13 |
| MABC | Friedman Aligned | 4.27647E-12 | 7.89502E-12 | 7.89502E-12 | 7.89502E-12 |
| MABC | Quade | 1.69013E-02 | 6.39553E-02 | 6.39553E-02 | 6.22288E-02 |
| WW | Friedman | 3.31974E-10 | 8.42703E-10 | 8.42703E-10 | 8.42703E-10 |
| WW | Friedman Aligned | 5.25791E-11 | 1.33470E-10 | 1.33470E-10 | 1.33470E-10 |
| WW | Quade | 3.73309E-03 | 1.37976E-02 | 1.37976E-02 | 1.37146E-02 |
| PSO | Friedman | 5.31136E-10 | 1.63426E-09 | 1.63426E-09 | 1.63426E-09 |
| PSO | Friedman Aligned | 2.13919E-10 | 8.06309E-10 | 8.06309E-10 | 8.06309E-10 |
| PSO | Quade | 6.98330E-04 | 6.98555E-04 | 6.98555E-04 | 6.98330E-04 |
| DE | Friedman | 3.19170E-09 | 1.10482E-08 | 1.10482E-08 | 1.10482E-08 |
| DE | Friedman Aligned | 5.47403E-03 | 2.02331E-02 | 2.02331E-02 | 2.00633E-02 |
| DE | Quade | 8.10275E-02 | 3.04024E-01 | 3.04024E-01 | 2.68016E-01 |
| ISCA | Friedman | 3.57233E-09 | 1.31901E-08 | 1.31901E-08 | 1.31901E-08 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.22682E-03 | 6.90912E-03 | 6.90912E-03 | 6.88795E-03 |
| NNA | Friedman | 4.05858E-09 | 1.52977E-08 | 1.52977E-08 | 1.52977E-08 |
| NNA | Friedman Aligned | 5.32343E-11 | 1.63798E-10 | 1.63798E-10 | 1.63798E-10 |
| NNA | Quade | 2.22682E-03 | 6.85703E-03 | 6.85703E-03 | 6.83591E-03 |
| CWOA | Friedman | 5.60543E-09 | 2.06970E-08 | 2.06970E-08 | 2.06970E-08 |
| CWOA | Friedman Aligned | 1.69719E-10 | 6.26656E-10 | 6.26656E-10 | 6.26656E-10 |
| CWOA | Quade | 2.01733E-03 | 3.72749E-03 | 3.62027E-03 | 3.72113E-03 |
| **Table S89** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 3.52483E-08 | 1.22013E-07 | 1.22013E-07 | 1.22013E-07 |
| IJAYA | Friedman Aligned | 1.53493E-02 | 5.32586E-02 | 5.32586E-02 | 5.21360E-02 |
| IJAYA | Quade | 1.15779E-01 | 4.08298E-01 | 4.08298E-01 | 3.46842E-01 |
| NDE | Friedman | 3.42808E-06 | 1.05479E-05 | 1.05479E-05 | 1.05479E-05 |
| NDE | Friedman Aligned | 1.43525E-01 | 4.49397E-01 | 4.49397E-01 | 3.79176E-01 |
| NDE | Quade | 1.41545E-01 | 4.43086E-01 | 4.43086E-01 | 3.74750E-01 |
| TLBO | Friedman | 8.34811E-02 | 2.13320E-01 | 2.13320E-01 | 1.98511E-01 |
| TLBO | Friedman Aligned | 7.63709E-01 | 1.0 | 1.0 | 9.74324E-01 |
| TLBO | Quade | 5.70319E-01 | 1.0 | 9.87681E-01 | 8.82846E-01 |
| EBLSHADE | Friedman | 8.44298E-01 | 1.0 | 8.29657E-01 | 9.67726E-01 |
| EBLSHADE | Friedman Aligned | 8.82085E-01 | 1.0 | 1.0 | 9.80682E-01 |
| EBLSHADE | Quade | 9.74027E-01 | 1.0 | 9.87681E-01 | 9.98817E-01 |
| STLBO | Friedman | 8.44298E-01 | 1.0 | 8.29657E-01 | 9.67726E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 9.87681E-01 | 1.0 | 9.87681E-01 | 9.98817E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S90.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Friedman Aligned | 1.26962E-10 | 4.39482E-10 | 4.39482E-10 | 4.39482E-10 |
| GOTLBO | Quade | 2.37937E-03 | 4.39710E-03 | 4.26800E-03 | 4.38825E-03 |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | 2.13792E-10 | 8.05830E-10 | 8.05830E-10 | 8.05830E-10 |
| PSO | Quade | 8.38441E-04 | 8.38765E-04 | 8.38765E-04 | 8.38441E-04 |
| MABC | Friedman | <1E-13 | 1.83187E-13 | 1.83187E-13 | 1.83187E-13 |
| MABC | Friedman Aligned | 1.31339E-12 | 2.42473E-12 | 2.42473E-12 | 2.42473E-12 |
| MABC | Quade | 1.91431E-02 | 7.24764E-02 | 7.24764E-02 | 7.02637E-02 |
| WW | Friedman | 7.79167E-11 | 2.39744E-10 | 2.39744E-10 | 2.39744E-10 |
| WW | Friedman Aligned | 4.75574E-11 | 1.20723E-10 | 1.20723E-10 | 1.20723E-10 |
| WW | Quade | 4.31959E-03 | 1.59678E-02 | 1.59678E-02 | 1.58567E-02 |
| ISCA | Friedman | 1.68524E-09 | 5.83353E-09 | 5.83353E-09 | 5.83353E-09 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.60407E-03 | 8.07052E-03 | 8.07052E-03 | 8.04163E-03 |
| NNA | Friedman | 1.89918E-09 | 7.01236E-09 | 7.01236E-09 | 7.01236E-09 |
| NNA | Friedman Aligned | 4.85501E-11 | 1.49385E-10 | 1.49385E-10 | 1.49385E-10 |
| NNA | Quade | 2.60407E-03 | 8.01975E-03 | 8.01975E-03 | 7.99087E-03 |
| CWOA | Friedman | 2.65354E-09 | 1.00018E-08 | 1.00018E-08 | 1.00018E-08 |
| CWOA | Friedman Aligned | 1.61977E-10 | 5.98069E-10 | 5.98069E-10 | 5.98069E-10 |
| CWOA | Quade | 2.37937E-03 | 4.39710E-03 | 4.26800E-03 | 4.38825E-03 |
| DE | Friedman | 7.94319E-09 | 2.93287E-08 | 2.93287E-08 | 2.93287E-08 |
| DE | Friedman Aligned | 9.47613E-03 | 3.50528E-02 | 3.50528E-02 | 3.45449E-02 |
| DE | Quade | 8.93754E-02 | 3.35921E-01 | 3.35921E-01 | 2.92269E-01 |
| **Table S90** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.23860E-07 | 4.28745E-07 | 4.28745E-07 | 4.28745E-07 |
| IJAYA | Friedman Aligned | 2.49893E-02 | 8.68378E-02 | 8.68378E-02 | 8.38734E-02 |
| IJAYA | Quade | 1.26669E-01 | 4.47523E-01 | 4.47523E-01 | 3.74268E-01 |
| NDE | Friedman | 1.01613E-05 | 3.12657E-05 | 3.12657E-05 | 3.12654E-05 |
| NDE | Friedman Aligned | 2.00048E-01 | 6.31055E-01 | 6.31055E-01 | 4.96806E-01 |
| NDE | Quade | 1.54053E-01 | 4.83018E-01 | 4.83018E-01 | 4.02358E-01 |
| TLBO | Friedman | 1.34018E-01 | 3.43902E-01 | 3.43902E-01 | 3.05986E-01 |
| TLBO | Friedman Aligned | 8.84270E-01 | 1.0 | 1.0 | 9.95806E-01 |
| TLBO | Quade | 5.99326E-01 | 1.0 | 1.0 | 9.01893E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S91.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.61989E-10 | 3.61989E-10 | 3.61989E-10 | 3.61989E-10 |
| PSO | Friedman Aligned | 1.81743E-10 | 6.85032E-10 | 6.85032E-10 | 6.85032E-10 |
| PSO | Quade | 1.73209E-01 | 1.88818E-01 | 1.88818E-01 | 1.73209E-01 |
| GOTLBO | Friedman | 3.50712E-09 | 6.47468E-09 | 6.47468E-09 | 6.47468E-09 |
| GOTLBO | Friedman Aligned | 7.27926E-11 | 2.51974E-10 | 2.51974E-10 | 2.51974E-10 |
| GOTLBO | Quade | 2.54954E-01 | 5.31222E-01 | 5.04676E-01 | 4.19195E-01 |
| CWOA | Friedman | 1.94580E-07 | 4.93934E-07 | 4.93934E-07 | 4.93934E-07 |
| CWOA | Friedman Aligned | 1.03934E-10 | 3.83757E-10 | 3.83757E-10 | 3.83757E-10 |
| CWOA | Quade | 2.54954E-01 | 5.31222E-01 | 5.04676E-01 | 4.19195E-01 |
| NNA | Friedman | 2.78684E-07 | 8.57490E-07 | 8.57490E-07 | 8.57490E-07 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 2.54954E-01 | 7.17822E-01 | 6.91359E-01 | 5.25213E-01 |
| ISCA | Friedman | 3.30631E-07 | 1.14449E-06 | 1.14449E-06 | 1.14449E-06 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.54954E-01 | 7.17822E-01 | 6.91359E-01 | 5.25213E-01 |
| WW | Friedman | 9.61871E-06 | 3.55153E-05 | 3.55153E-05 | 3.55148E-05 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 2.54954E-01 | 9.90015E-01 | 9.90015E-01 | 6.52450E-01 |
| MABC | Friedman | 1.07108E-03 | 4.03815E-03 | 4.03815E-03 | 4.03117E-03 |
| MABC | Friedman Aligned | 2.42220E-11 | 7.45293E-11 | 7.45293E-11 | 7.45293E-11 |
| MABC | Quade | 4.99948E-01 | 1.0 | 1.0 | 9.26630E-01 |
| DE | Friedman | 2.54875E-01 | 9.93629E-01 | 9.93629E-01 | 6.62534E-01 |
| DE | Friedman Aligned | 2.74197E-01 | 1.0 | 1.0 | 6.93733E-01 |
| DE | Quade | 8.73049E-01 | 1.0 | 1.0 | 9.99510E-01 |
| **Table S91** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 4.94513E-01 | 1.0 | 1.0 | 9.05728E-01 |
| IJAYA | Friedman Aligned | 4.44005E-01 | 1.0 | 1.0 | 8.68915E-01 |
| IJAYA | Quade | 9.55250E-01 | 1.0 | 1.0 | 9.99979E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S92.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.61343E-02 | 1.62557E-02 | 1.62557E-02 | 1.61343E-02 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 8.83074E-01 | 1.0 | 1.0 | 8.83074E-01 |
| GOTLBO | Friedman | 3.55630E-02 | 6.66648E-02 | 6.66648E-02 | 6.46651E-02 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 9.16596E-01 | 1.0 | 1.0 | 9.89806E-01 |
| CWOA | Friedman | 1.70290E-01 | 4.63814E-01 | 4.63814E-01 | 3.77416E-01 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 9.16596E-01 | 1.0 | 1.0 | 9.89806E-01 |
| ISCA | Friedman | 1.70313E-01 | 5.91053E-01 | 5.91053E-01 | 4.57385E-01 |
| ISCA | Friedman Aligned | 6.75460E-13 | 2.49401E-12 | 2.49401E-12 | 2.49401E-12 |
| ISCA | Quade | 9.16596E-01 | 1.0 | 1.0 | 9.96412E-01 |
| NNA | Friedman | 1.70313E-01 | 5.58293E-01 | 5.58293E-01 | 4.37004E-01 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 9.16596E-01 | 1.0 | 1.0 | 9.96412E-01 |
| WW | Friedman | 4.65704E-01 | 1.0 | 1.0 | 9.01170E-01 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 9.16596E-01 | 1.0 | 1.0 | 9.99320E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S92** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S93.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | 1.11422E-12 | 1.19904E-12 | 1.19904E-12 | 1.19904E-12 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.05739E-02 | 6.19145E-02 | 6.12106E-02 | 6.02176E-02 |
| NNA | Friedman | 1.11422E-12 | 1.82943E-12 | 1.82943E-12 | 1.82943E-12 |
| NNA | Friedman Aligned | 4.34834E-11 | 1.33795E-10 | 1.33795E-10 | 1.33795E-10 |
| NNA | Quade | 2.05739E-02 | 6.19145E-02 | 6.12106E-02 | 6.02176E-02 |
| WW | Friedman | 1.11422E-12 | 1.11422E-12 | 1.11422E-12 | 1.11422E-12 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 2.85496E-02 | 1.06236E-01 | 1.06236E-01 | 1.01427E-01 |
| CWOA | Friedman | 1.22824E-12 | 3.77920E-12 | 3.77920E-12 | 3.77920E-12 |
| CWOA | Friedman Aligned | 1.53052E-10 | 5.65116E-10 | 5.65116E-10 | 5.65116E-10 |
| CWOA | Quade | 2.05739E-02 | 3.83174E-02 | 3.68718E-02 | 3.76516E-02 |
| GOTLBO | Friedman | 8.01828E-11 | 2.77556E-10 | 2.77556E-10 | 2.77556E-10 |
| GOTLBO | Friedman Aligned | 1.18047E-10 | 4.08623E-10 | 4.08623E-10 | 4.08623E-10 |
| GOTLBO | Quade | 2.05739E-02 | 3.83174E-02 | 3.68718E-02 | 3.76516E-02 |
| MABC | Friedman | 5.45986E-10 | 2.01595E-09 | 1.96197E-09 | 2.01595E-09 |
| MABC | Friedman Aligned | 2.04947E-13 | 5.20251E-13 | 5.20251E-13 | 5.20251E-13 |
| MABC | Quade | 9.31341E-02 | 3.58952E-01 | 3.58952E-01 | 3.08217E-01 |
| PSO | Friedman | 5.45986E-10 | 2.01595E-09 | 1.96197E-09 | 2.01595E-09 |
| PSO | Friedman Aligned | 2.12199E-10 | 7.99827E-10 | 7.99827E-10 | 7.99827E-10 |
| PSO | Quade | 9.34861E-03 | 9.38919E-03 | 9.38919E-03 | 9.34861E-03 |
| DE | Friedman | 3.05182E-05 | 1.12683E-04 | 1.12683E-04 | 1.12678E-04 |
| DE | Friedman Aligned | 1.72967E-02 | 6.40787E-02 | 6.40787E-02 | 6.23920E-02 |
| DE | Quade | 2.96784E-01 | 1.0 | 1.0 | 7.27477E-01 |
| **Table S93** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 2.29338E-04 | 7.93891E-04 | 7.93891E-04 | 7.93639E-04 |
| IJAYA | Friedman Aligned | 4.24809E-02 | 1.48029E-01 | 1.48029E-01 | 1.39519E-01 |
| IJAYA | Quade | 3.76114E-01 | 1.0 | 1.0 | 8.04679E-01 |
| NDE | Friedman | 4.96635E-03 | 1.52898E-02 | 1.52898E-02 | 1.52024E-02 |
| NDE | Friedman Aligned | 2.83997E-01 | 9.06459E-01 | 9.06459E-01 | 6.42247E-01 |
| NDE | Quade | 4.27401E-01 | 1.0 | 1.0 | 8.20144E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S94.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.99999E-01 | 1.0 | 1.0 | 9.99999E-01 |
| PSO | Friedman Aligned | 1.10006E-03 | 1.10062E-03 | 1.10062E-03 | 1.10006E-03 |
| PSO | Quade | 9.99999E-01 | 1.0 | 1.0 | 9.99999E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S94** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 7.09370E-01 | 1.0 | 1.0 | 8.97849E-01 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S95.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Friedman Aligned | 1.34914E-10 | 4.67010E-10 | 4.67010E-10 | 4.67010E-10 |
| GOTLBO | Quade | 2.14059E-03 | 3.95545E-03 | 3.84083E-03 | 3.94829E-03 |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | 2.13919E-10 | 8.06309E-10 | 8.06309E-10 | 8.06309E-10 |
| PSO | Quade | 7.45736E-04 | 7.45992E-04 | 7.45992E-04 | 7.45736E-04 |
| MABC | Friedman | <1E-13 | 1.95399E-13 | 1.95399E-13 | 1.95399E-13 |
| MABC | Friedman Aligned | 4.27647E-12 | 7.89502E-12 | 7.89502E-12 | 7.89502E-12 |
| MABC | Quade | 1.76757E-02 | 6.68978E-02 | 6.68978E-02 | 6.50101E-02 |
| WW | Friedman | 8.30101E-11 | 2.55416E-10 | 2.55416E-10 | 2.55416E-10 |
| WW | Friedman Aligned | 5.25791E-11 | 1.33470E-10 | 1.33470E-10 | 1.33470E-10 |
| WW | Quade | 3.93413E-03 | 1.45414E-02 | 1.45414E-02 | 1.44493E-02 |
| ISCA | Friedman | 1.77301E-09 | 6.13733E-09 | 6.13733E-09 | 6.13733E-09 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 2.35565E-03 | 7.30587E-03 | 7.30587E-03 | 7.28220E-03 |
| NNA | Friedman | 1.99588E-09 | 7.36942E-09 | 7.36942E-09 | 7.36942E-09 |
| NNA | Friedman Aligned | 5.32343E-11 | 1.63798E-10 | 1.63798E-10 | 1.63798E-10 |
| NNA | Quade | 2.35565E-03 | 7.25406E-03 | 7.25406E-03 | 7.23042E-03 |
| CWOA | Friedman | 2.78373E-09 | 1.04925E-08 | 1.04925E-08 | 1.04925E-08 |
| CWOA | Friedman Aligned | 1.69719E-10 | 6.26656E-10 | 6.26656E-10 | 6.26656E-10 |
| CWOA | Quade | 2.14059E-03 | 3.95545E-03 | 3.84083E-03 | 3.94829E-03 |
| DE | Friedman | 7.39494E-09 | 2.73044E-08 | 2.73044E-08 | 2.73044E-08 |
| DE | Friedman Aligned | 5.47403E-03 | 2.02331E-02 | 2.02331E-02 | 2.00633E-02 |
| DE | Quade | 8.39403E-02 | 3.15141E-01 | 3.15141E-01 | 2.76546E-01 |
| **Table S95** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.15930E-07 | 4.01296E-07 | 4.01296E-07 | 4.01296E-07 |
| IJAYA | Friedman Aligned | 1.53493E-02 | 5.32586E-02 | 5.32586E-02 | 5.21360E-02 |
| IJAYA | Quade | 1.19590E-01 | 4.22010E-01 | 4.22010E-01 | 3.56536E-01 |
| NDE | Friedman | 9.60841E-06 | 2.95644E-05 | 2.95644E-05 | 2.95640E-05 |
| NDE | Friedman Aligned | 1.43525E-01 | 4.49397E-01 | 4.49397E-01 | 3.79176E-01 |
| NDE | Quade | 1.45931E-01 | 4.57073E-01 | 4.57073E-01 | 3.84528E-01 |
| TLBO | Friedman | 1.30872E-01 | 3.35738E-01 | 3.35738E-01 | 2.99567E-01 |
| TLBO | Friedman Aligned | 7.63709E-01 | 1.0 | 1.0 | 9.74324E-01 |
| TLBO | Quade | 5.80649E-01 | 1.0 | 1.0 | 8.89865E-01 |
| EBLSHADE | Friedman | 9.93529E-01 | 1.0 | 1.0 | 9.99909E-01 |
| EBLSHADE | Friedman Aligned | 8.82085E-01 | 1.0 | 1.0 | 9.80682E-01 |
| EBLSHADE | Quade | 9.83928E-01 | 1.0 | 1.0 | 9.99512E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S96.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S96** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S97.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.73246E-08 | 9.73246E-08 | 9.73246E-08 | 9.73246E-08 |
| PSO | Friedman Aligned | 1.70370E-10 | 6.29058E-10 | 6.29058E-10 | 6.29058E-10 |
| PSO | Quade | 2.46974E-01 | 2.80583E-01 | 2.80583E-01 | 2.46974E-01 |
| GOTLBO | Friedman | 6.35961E-07 | 1.17408E-06 | 1.17408E-06 | 1.17408E-06 |
| GOTLBO | Friedman Aligned | 5.77172E-11 | 1.77591E-10 | 1.77591E-10 | 1.77591E-10 |
| GOTLBO | Quade | 3.41083E-01 | 7.45945E-01 | 7.07294E-01 | 5.37051E-01 |
| CWOA | Friedman | 1.92373E-05 | 4.88336E-05 | 4.88336E-05 | 4.88325E-05 |
| CWOA | Friedman Aligned | 8.61309E-11 | 2.98146E-10 | 2.98146E-10 | 2.98146E-10 |
| CWOA | Quade | 3.41083E-01 | 7.45945E-01 | 7.07294E-01 | 5.37051E-01 |
| NNA | Friedman | 2.54032E-05 | 7.81643E-05 | 7.81643E-05 | 7.81616E-05 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 3.41083E-01 | 9.81080E-01 | 9.41198E-01 | 6.43922E-01 |
| ISCA | Friedman | 2.83482E-05 | 9.81294E-05 | 9.81294E-05 | 9.81251E-05 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 3.41083E-01 | 9.81080E-01 | 9.41198E-01 | 6.43922E-01 |
| WW | Friedman | 4.57580E-04 | 1.68973E-03 | 1.68973E-03 | 1.68849E-03 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 3.41083E-01 | 1.0 | 1.0 | 7.60671E-01 |
| MABC | Friedman | 1.94748E-02 | 7.37379E-02 | 7.37379E-02 | 7.14482E-02 |
| MABC | Friedman Aligned | 7.15972E-09 | 2.69866E-08 | 2.69866E-08 | 2.69866E-08 |
| MABC | Quade | 5.96552E-01 | 1.0 | 1.0 | 9.67332E-01 |
| DE | Friedman | 7.88581E-01 | 1.0 | 1.0 | 9.96777E-01 |
| DE | Friedman Aligned | 8.62956E-01 | 1.0 | 1.0 | 9.99350E-01 |
| DE | Quade | 9.44493E-01 | 1.0 | 1.0 | 9.99977E-01 |
| **Table S97** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S98.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.04976E-01 | 1.0 | 1.0 | 9.04976E-01 |
| PSO | Friedman Aligned | 1.47451E-09 | 2.72216E-09 | 2.72216E-09 | 2.72216E-09 |
| PSO | Quade | 9.99878E-01 | 1.0 | 1.0 | 9.99878E-01 |
| GOTLBO | Friedman | 9.39917E-01 | 1.0 | 1.0 | 9.94436E-01 |
| GOTLBO | Friedman Aligned | 1.04059E-07 | 2.64149E-07 | 2.64149E-07 | 2.64149E-07 |
| GOTLBO | Quade | 9.99979E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.99718E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 5.38809E-11 | 5.38809E-11 | 5.38809E-11 | 5.38809E-11 |
| CWOA | Quade | 9.99979E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.99909E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.31567E-02 | 4.06680E-02 | 4.06680E-02 | 3.99318E-02 |
| NNA | Quade | 9.99994E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S98** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 5.21317E-02 | 1.83435E-01 | 1.83435E-01 | 1.69170E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S99.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.33915E-01 | 1.0 | 1.0 | 9.33915E-01 |
| PSO | Friedman Aligned | 4.34003E-10 | 4.34003E-10 | 4.34003E-10 | 4.34003E-10 |
| PSO | Quade | 9.99928E-01 | 1.0 | 1.0 | 9.99928E-01 |
| GOTLBO | Friedman | 9.59537E-01 | 1.0 | 1.0 | 9.97318E-01 |
| GOTLBO | Friedman Aligned | 2.86941E-02 | 7.36566E-02 | 7.36566E-02 | 7.12394E-02 |
| GOTLBO | Quade | 9.99991E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.99963E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 3.00592E-04 | 5.55010E-04 | 5.55010E-04 | 5.54869E-04 |
| CWOA | Quade | 9.99991E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S99** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S100.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.67662E-01 | 1.0 | 1.0 | 9.67662E-01 |
| PSO | Friedman Aligned | 1.24911E-01 | 1.32747E-01 | 1.32747E-01 | 1.24911E-01 |
| PSO | Quade | 9.99999E-01 | 1.0 | 1.0 | 9.99999E-01 |
| GOTLBO | Friedman | 9.81485E-01 | 1.0 | 1.0 | 9.99367E-01 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S100** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S101.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *I*ph evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.92009E-01 | 4.88192E-01 | 4.88192E-01 | 3.92009E-01 |
| PSO | Friedman Aligned | 9.14469E-12 | 9.14469E-12 | 9.14469E-12 | 9.14469E-12 |
| PSO | Quade | 9.97302E-01 | 1.0 | 1.0 | 9.97302E-01 |
| GOTLBO | Friedman | 5.10410E-01 | 1.0 | 1.0 | 7.32463E-01 |
| GOTLBO | Friedman Aligned | 4.73013E-03 | 1.20291E-02 | 1.20291E-02 | 1.19636E-02 |
| GOTLBO | Quade | 9.98614E-01 | 1.0 | 1.0 | 9.99995E-01 |
| ISCA | Friedman | 8.70839E-01 | 1.0 | 1.0 | 9.97589E-01 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 9.98614E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 8.70839E-01 | 1.0 | 1.0 | 9.97192E-01 |
| NNA | Friedman Aligned | 9.40262E-01 | 1.0 | 1.0 | 9.99828E-01 |
| NNA | Quade | 9.98614E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 8.70839E-01 | 1.0 | 1.0 | 9.94458E-01 |
| CWOA | Friedman Aligned | 2.40580E-05 | 4.44153E-05 | 4.44153E-05 | 4.44144E-05 |
| CWOA | Quade | 9.98614E-01 | 1.0 | 1.0 | 9.99995E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S101** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S102.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.12065E-07 | 1.12065E-07 | 1.12065E-07 | 1.12065E-07 |
| PSO | Friedman Aligned | 9.63011E-11 | 2.44457E-10 | 2.36238E-10 | 2.44457E-10 |
| PSO | Quade | 1.61148E-01 | 1.74539E-01 | 1.74539E-01 | 1.61148E-01 |
| NNA | Friedman | 1.32148E-02 | 2.45341E-02 | 2.45341E-02 | 2.42601E-02 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 8.03072E-01 | 1.0 | 1.0 | 9.50205E-01 |
| ISCA | Friedman | 2.56447E-02 | 6.57499E-02 | 6.57499E-02 | 6.38197E-02 |
| ISCA | Friedman Aligned | 1.65848E-09 | 6.12362E-09 | 6.12362E-09 | 6.12362E-09 |
| ISCA | Quade | 8.03072E-01 | 1.0 | 1.0 | 9.58241E-01 |
| WW | Friedman | 2.56658E-02 | 7.96836E-02 | 7.96836E-02 | 7.68862E-02 |
| WW | Friedman Aligned | 5.78214E-09 | 2.17942E-08 | 2.17942E-08 | 2.17942E-08 |
| WW | Quade | 8.03072E-01 | 1.0 | 1.0 | 9.56969E-01 |
| CWOA | Friedman | 7.51644E-02 | 2.66458E-01 | 2.66458E-01 | 2.36988E-01 |
| CWOA | Friedman Aligned | 9.81004E-12 | 1.81108E-11 | 1.81108E-11 | 1.81108E-11 |
| CWOA | Quade | 8.03072E-01 | 1.0 | 1.0 | 9.70509E-01 |
| GOTLBO | Friedman | 1.36860E-01 | 5.25381E-01 | 5.25381E-01 | 4.19245E-01 |
| GOTLBO | Friedman Aligned | 8.50149E-10 | 2.94282E-09 | 2.94282E-09 | 2.94282E-09 |
| GOTLBO | Quade | 8.03072E-01 | 1.0 | 1.0 | 9.95652E-01 |
| IJAYA | Friedman | 1.60075E-01 | 6.27579E-01 | 6.27579E-01 | 4.81863E-01 |
| IJAYA | Friedman Aligned | 9.63011E-11 | 2.44457E-10 | 2.36238E-10 | 2.44457E-10 |
| IJAYA | Quade | 8.03072E-01 | 1.0 | 1.0 | 9.95652E-01 |
| MABC | Friedman | 4.30602E-01 | 1.0 | 1.0 | 8.74997E-01 |
| MABC | Friedman Aligned | 2.44538E-03 | 9.03334E-03 | 9.03334E-03 | 8.99941E-03 |
| MABC | Quade | 8.68097E-01 | 1.0 | 1.0 | 9.99435E-01 |
| **Table S102** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S103.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 4.61853E-13 | 4.61853E-13 | 4.61853E-13 | 4.61853E-13 |
| IJAYA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| IJAYA | Quade | 1.77868E-02 | 6.59918E-02 | 5.94563E-02 | 6.41177E-02 |
| GOTLBO | Friedman | 6.49480E-13 | 1.19904E-12 | 1.19904E-12 | 1.19904E-12 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.77868E-02 | 6.59918E-02 | 5.94563E-02 | 6.41177E-02 |
| MABC | Friedman | 7.57246E-13 | 1.92224E-12 | 1.92224E-12 | 1.92224E-12 |
| MABC | Friedman Aligned | 1.47660E-10 | 4.54338E-10 | 4.54338E-10 | 4.54338E-10 |
| MABC | Quade | 3.24065E-02 | 1.20412E-01 | 1.20412E-01 | 1.14530E-01 |
| CWOA | Friedman | 3.15142E-12 | 9.69669E-12 | 9.69669E-12 | 9.69669E-12 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 9.53581E-03 | 2.92630E-02 | 2.92630E-02 | 2.88853E-02 |
| WW | Friedman | 4.24027E-11 | 1.46779E-10 | 1.46779E-10 | 1.46779E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 9.53581E-03 | 2.05775E-02 | 2.05775E-02 | 2.03861E-02 |
| ISCA | Friedman | 5.89440E-11 | 2.17639E-10 | 2.17639E-10 | 2.17639E-10 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 9.53581E-03 | 2.25189E-02 | 2.25189E-02 | 2.22920E-02 |
| NNA | Friedman | 2.68345E-10 | 1.01145E-09 | 1.01145E-09 | 1.01145E-09 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 9.53581E-03 | 1.76760E-02 | 1.76760E-02 | 1.75335E-02 |
| DE | Friedman | 4.09489E-10 | 1.51196E-09 | 1.51196E-09 | 1.51196E-09 |
| DE | Friedman Aligned | 8.23115E-11 | 2.96018E-10 | 2.84924E-10 | 2.96018E-10 |
| DE | Quade | 7.19727E-02 | 2.51985E-01 | 2.51985E-01 | 2.27835E-01 |
| **Table S103** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.40866E-09 | 4.87613E-09 | 4.87613E-09 | 4.87613E-09 |
| PSO | Friedman Aligned | 8.01715E-11 | 2.96018E-10 | 2.84924E-10 | 2.96018E-10 |
| PSO | Quade | 1.23157E-04 | 1.23164E-04 | 1.23164E-04 | 1.23157E-04 |
| NDE | Friedman | 8.11697E-06 | 2.49753E-05 | 2.49753E-05 | 2.49751E-05 |
| NDE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NDE | Quade | 1.39601E-01 | 4.36892E-01 | 4.36892E-01 | 3.70384E-01 |
| TLBO | Friedman | 1.57702E-01 | 4.05499E-01 | 4.05499E-01 | 3.53159E-01 |
| TLBO | Friedman Aligned | 9.86791E-02 | 2.52471E-01 | 2.52471E-01 | 2.31820E-01 |
| TLBO | Quade | 6.59156E-01 | 1.0 | 1.0 | 9.34925E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S104.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 4.24327E-13 | 4.24327E-13 | 4.24327E-13 | 4.24327E-13 |
| MABC | Friedman Aligned | 1.30897E-10 | 4.93382E-10 | 4.67194E-10 | 4.93382E-10 |
| MABC | Quade | 2.61883E-02 | 9.71881E-02 | 9.71881E-02 | 9.33364E-02 |
| IJAYA | Friedman | 1.17484E-12 | 2.16893E-12 | 2.16893E-12 | 2.16893E-12 |
| IJAYA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| IJAYA | Quade | 1.40454E-02 | 5.20574E-02 | 4.69358E-02 | 5.08871E-02 |
| GOTLBO | Friedman | 2.08219E-12 | 5.28555E-12 | 5.28555E-12 | 5.28555E-12 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.40454E-02 | 5.20574E-02 | 4.69358E-02 | 5.08871E-02 |
| CWOA | Friedman | 1.27601E-11 | 3.92619E-11 | 3.92619E-11 | 3.92619E-11 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 7.23714E-03 | 2.25799E-02 | 2.25799E-02 | 2.23546E-02 |
| DE | Friedman | 1.39301E-10 | 4.82194E-10 | 4.57383E-10 | 4.82194E-10 |
| DE | Friedman Aligned | 1.37839E-10 | 4.93382E-10 | 4.77135E-10 | 4.93382E-10 |
| DE | Quade | 5.97508E-02 | 2.08782E-01 | 2.08782E-01 | 1.92059E-01 |
| WW | Friedman | 1.39301E-10 | 4.82194E-10 | 4.57383E-10 | 4.82194E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 7.23714E-03 | 1.56830E-02 | 1.56830E-02 | 1.55717E-02 |
| ISCA | Friedman | 1.59993E-10 | 6.03050E-10 | 6.03050E-10 | 6.03050E-10 |
| ISCA | Friedman Aligned | 2.51032E-06 | 7.72406E-06 | 7.72406E-06 | 7.72404E-06 |
| ISCA | Quade | 7.23714E-03 | 1.72329E-02 | 1.72329E-02 | 1.70999E-02 |
| NNA | Friedman | 6.61310E-10 | 2.44176E-09 | 2.44176E-09 | 2.44176E-09 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 7.23714E-03 | 1.34020E-02 | 1.34020E-02 | 1.33199E-02 |
| **Table S104** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 2.30556E-09 | 7.98080E-09 | 7.98080E-09 | 7.98080E-09 |
| PSO | Friedman Aligned | 1.30897E-10 | 4.93382E-10 | 4.67194E-10 | 4.93382E-10 |
| PSO | Quade | 8.49909E-05 | 8.49943E-05 | 8.49943E-05 | 8.49909E-05 |
| NDE | Friedman | 2.70991E-06 | 8.33820E-06 | 8.33820E-06 | 8.33817E-06 |
| NDE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NDE | Quade | 1.18862E-01 | 3.71008E-01 | 3.71008E-01 | 3.22508E-01 |
| TLBO | Friedman | 9.99240E-02 | 2.55682E-01 | 2.55682E-01 | 2.34510E-01 |
| TLBO | Friedman Aligned | 2.97627E-04 | 7.55533E-04 | 7.55533E-04 | 7.55343E-04 |
| TLBO | Quade | 6.04542E-01 | 1.0 | 9.88447E-01 | 9.05102E-01 |
| EBLSHADE | Friedman | 8.44298E-01 | 1.0 | 9.33322E-01 | 9.67726E-01 |
| EBLSHADE | Friedman Aligned | 5.75004E-02 | 1.06394E-01 | 1.06394E-01 | 1.03564E-01 |
| EBLSHADE | Quade | 9.49745E-01 | 1.0 | 9.88447E-01 | 9.95999E-01 |
| STLBO | Friedman | 9.33322E-01 | 1.0 | 9.33322E-01 | 9.67726E-01 |
| STLBO | Friedman Aligned | 9.97074E-01 | 9.97074E-01 | 9.97074E-01 | 9.97074E-01 |
| STLBO | Quade | 9.88447E-01 | 1.0 | 9.88447E-01 | 9.95999E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S105.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 5.48450E-13 | 5.48450E-13 | 5.48450E-13 | 5.48450E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 5.93630E-02 | 6.10542E-02 | 6.10542E-02 | 5.93630E-02 |
| NNA | Friedman | 6.21587E-06 | 1.14755E-05 | 1.14755E-05 | 1.14754E-05 |
| NNA | Friedman Aligned | 8.83864E-11 | 3.26350E-10 | 3.26350E-10 | 3.26350E-10 |
| NNA | Quade | 5.46368E-01 | 1.0 | 1.0 | 7.67608E-01 |
| ISCA | Friedman | 2.15654E-05 | 5.47435E-05 | 5.47435E-05 | 5.47421E-05 |
| ISCA | Friedman Aligned | 5.41510E-11 | 2.04108E-10 | 2.04108E-10 | 2.04108E-10 |
| ISCA | Quade | 5.46368E-01 | 1.0 | 1.0 | 7.94113E-01 |
| WW | Friedman | 2.54032E-05 | 7.81643E-05 | 7.81643E-05 | 7.81616E-05 |
| WW | Friedman Aligned | 2.52162E-11 | 9.31060E-11 | 9.31060E-11 | 9.31060E-11 |
| WW | Quade | 5.46368E-01 | 1.0 | 1.0 | 7.87852E-01 |
| CWOA | Friedman | 1.70294E-04 | 5.89510E-04 | 5.89510E-04 | 5.89355E-04 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 5.46368E-01 | 1.0 | 1.0 | 8.32107E-01 |
| GOTLBO | Friedman | 5.51957E-04 | 2.03830E-03 | 2.03830E-03 | 2.03648E-03 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 5.46368E-01 | 1.0 | 1.0 | 9.41246E-01 |
| IJAYA | Friedman | 8.19698E-04 | 3.09021E-03 | 3.09021E-03 | 3.08612E-03 |
| IJAYA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| IJAYA | Quade | 5.46368E-01 | 1.0 | 1.0 | 9.41246E-01 |
| MABC | Friedman | 6.69221E-03 | 2.47416E-02 | 2.47416E-02 | 2.44879E-02 |
| MABC | Friedman Aligned | 1.31135E-09 | 4.53928E-09 | 4.53928E-09 | 4.53928E-09 |
| MABC | Quade | 6.42995E-01 | 1.0 | 1.0 | 9.77698E-01 |
| **Table S105** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 9.84763E-02 | 3.46279E-01 | 3.46279E-01 | 3.01524E-01 |
| DE | Friedman Aligned | 2.46722E-11 | 8.54037E-11 | 8.54037E-11 | 8.54037E-11 |
| DE | Quade | 8.43172E-01 | 1.0 | 1.0 | 9.98360E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S106.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.23303E-05 | 3.23308E-05 | 3.23308E-05 | 3.23303E-05 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 3.74066E-01 | 4.60169E-01 | 4.60169E-01 | 3.74066E-01 |
| NNA | Friedman | 2.44230E-01 | 5.05979E-01 | 5.05979E-01 | 4.03667E-01 |
| NNA | Friedman Aligned | 3.04347E-08 | 9.36452E-08 | 9.36452E-08 | 9.36452E-08 |
| NNA | Quade | 9.60869E-01 | 1.0 | 1.0 | 9.97479E-01 |
| ISCA | Friedman | 3.34378E-01 | 9.86196E-01 | 9.86196E-01 | 6.44147E-01 |
| ISCA | Friedman Aligned | 2.68086E-11 | 6.80527E-11 | 6.80527E-11 | 6.80527E-11 |
| ISCA | Quade | 9.60869E-01 | 1.0 | 1.0 | 9.98098E-01 |
| WW | Friedman | 3.34378E-01 | 1.0 | 1.0 | 6.85519E-01 |
| WW | Friedman Aligned | 2.27968E-11 | 4.20863E-11 | 4.20863E-11 | 4.20863E-11 |
| WW | Quade | 9.60869E-01 | 1.0 | 1.0 | 9.98033E-01 |
| CWOA | Friedman | 5.44864E-01 | 1.0 | 1.0 | 9.34440E-01 |
| CWOA | Friedman Aligned | 2.33931E-04 | 8.09818E-04 | 8.09818E-04 | 8.09527E-04 |
| CWOA | Quade | 9.60869E-01 | 1.0 | 1.0 | 9.99016E-01 |
| GOTLBO | Friedman | 7.04380E-01 | 1.0 | 1.0 | 9.88888E-01 |
| GOTLBO | Friedman Aligned | 3.35103E-03 | 1.26406E-02 | 1.26406E-02 | 1.25723E-02 |
| GOTLBO | Quade | 9.60869E-01 | 1.0 | 1.0 | 9.99985E-01 |
| IJAYA | Friedman | 7.42795E-01 | 1.0 | 1.0 | 9.94013E-01 |
| IJAYA | Friedman Aligned | 9.34352E-04 | 3.45078E-03 | 3.45078E-03 | 3.44558E-03 |
| IJAYA | Quade | 9.60869E-01 | 1.0 | 1.0 | 9.99985E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S106** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S107.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 1.24342E-03 | 1.24413E-03 | 1.24413E-03 | 1.24342E-03 |
| NNA | Friedman | 1.15463E-13 | 2.13163E-13 | 2.13163E-13 | 2.13163E-13 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 5.08290E-02 | 9.59217E-02 | 9.59217E-02 | 9.18149E-02 |
| ISCA | Friedman | 1.69346E-13 | 4.29878E-13 | 4.29878E-13 | 4.29878E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 5.08290E-02 | 1.14968E-01 | 1.14968E-01 | 1.09199E-01 |
| WW | Friedman | 2.55462E-13 | 7.86038E-13 | 7.86038E-13 | 7.86038E-13 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 5.08290E-02 | 1.07920E-01 | 1.07920E-01 | 1.02778E-01 |
| CWOA | Friedman | 6.62297E-12 | 2.29257E-11 | 2.29257E-11 | 2.29257E-11 |
| CWOA | Friedman Aligned | 1.32214E-10 | 4.88175E-10 | 4.88175E-10 | 4.88175E-10 |
| CWOA | Quade | 5.08290E-02 | 1.41499E-01 | 1.41499E-01 | 1.32919E-01 |
| GOTLBO | Friedman | 5.56590E-11 | 2.05510E-10 | 2.05510E-10 | 2.05510E-10 |
| GOTLBO | Friedman Aligned | 1.58709E-10 | 5.98211E-10 | 5.07874E-10 | 5.98211E-10 |
| GOTLBO | Quade | 7.32625E-02 | 2.76054E-01 | 2.47539E-01 | 2.44918E-01 |
| IJAYA | Friedman | 1.24403E-10 | 4.68905E-10 | 4.68905E-10 | 4.68905E-10 |
| IJAYA | Friedman Aligned | 1.58709E-10 | 5.98211E-10 | 5.07874E-10 | 5.98211E-10 |
| IJAYA | Quade | 7.32625E-02 | 2.76054E-01 | 2.47539E-01 | 2.44918E-01 |
| MABC | Friedman | 6.40678E-09 | 2.36558E-08 | 2.36558E-08 | 2.36558E-08 |
| MABC | Friedman Aligned | 1.58709E-10 | 5.98211E-10 | 5.07874E-10 | 5.98211E-10 |
| MABC | Quade | 1.14751E-01 | 4.33578E-01 | 4.33578E-01 | 3.62399E-01 |
| **Table S107** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.86918E-06 | 6.47023E-06 | 6.47023E-06 | 6.47021E-06 |
| DE | Friedman Aligned | 7.73811E-11 | 2.67858E-10 | 2.67858E-10 | 2.67858E-10 |
| DE | Quade | 2.13275E-01 | 7.65059E-01 | 7.65059E-01 | 5.64100E-01 |
| NDE | Friedman | 3.24249E-03 | 9.98062E-03 | 9.98062E-03 | 9.94333E-03 |
| NDE | Friedman Aligned | 1.10920E-09 | 3.41294E-09 | 3.41294E-09 | 3.41294E-09 |
| NDE | Quade | 3.50848E-01 | 1.0 | 1.0 | 7.35391E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S108.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.14886E-03 | 1.14947E-03 | 1.14947E-03 | 1.14886E-03 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 6.23178E-01 | 9.40245E-01 | 9.40245E-01 | 6.23178E-01 |
| NNA | Friedman | 7.90699E-01 | 1.0 | 1.0 | 9.44276E-01 |
| NNA | Friedman Aligned | 1.74782E-12 | 3.22675E-12 | 3.22675E-12 | 3.22675E-12 |
| NNA | Quade | 9.96635E-01 | 1.0 | 1.0 | 9.99973E-01 |
| ISCA | Friedman | 8.58987E-01 | 1.0 | 1.0 | 9.93075E-01 |
| ISCA | Friedman Aligned | 5.51352E-08 | 1.39958E-07 | 1.39958E-07 | 1.39958E-07 |
| ISCA | Quade | 9.96635E-01 | 1.0 | 1.0 | 9.99986E-01 |
| WW | Friedman | 8.58987E-01 | 1.0 | 1.0 | 9.95414E-01 |
| WW | Friedman Aligned | 3.83622E-04 | 1.18053E-03 | 1.18053E-03 | 1.17991E-03 |
| WW | Quade | 9.96635E-01 | 1.0 | 1.0 | 9.99983E-01 |
| CWOA | Friedman | 9.69231E-01 | 1.0 | 1.0 | 9.99994E-01 |
| CWOA | Friedman Aligned | 7.64084E-01 | 1.0 | 1.0 | 9.93258E-01 |
| CWOA | Quade | 9.96635E-01 | 1.0 | 1.0 | 9.99997E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S108** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 9.20605E-01 | 1.0 | 1.0 | 9.99913E-01 |
| IJAYA | Quade | 9.99972E-01 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S109.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 7.82263E-13 | 7.82263E-13 | 7.82263E-13 | 7.82263E-13 |
| MABC | Friedman Aligned | 1.30815E-10 | 4.93071E-10 | 4.68469E-10 | 4.93071E-10 |
| MABC | Quade | 2.72384E-02 | 1.01106E-01 | 1.01106E-01 | 9.69411E-02 |
| IJAYA | Friedman | 7.82263E-13 | 1.19904E-12 | 1.19904E-12 | 1.19904E-12 |
| IJAYA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| IJAYA | Quade | 1.46704E-02 | 5.43832E-02 | 4.90263E-02 | 5.31067E-02 |
| GOTLBO | Friedman | 1.18350E-12 | 3.00426E-12 | 3.00426E-12 | 3.00426E-12 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.46704E-02 | 5.43832E-02 | 4.90263E-02 | 5.31067E-02 |
| CWOA | Friedman | 7.72016E-12 | 2.37543E-11 | 2.37543E-11 | 2.37543E-11 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 7.61417E-03 | 2.36840E-02 | 2.36840E-02 | 2.34363E-02 |
| WW | Friedman | 9.08066E-11 | 3.14331E-10 | 3.14331E-10 | 3.14331E-10 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 7.61417E-03 | 1.64871E-02 | 1.64871E-02 | 1.63641E-02 |
| ISCA | Friedman | 1.23284E-10 | 4.55202E-10 | 4.55202E-10 | 4.55202E-10 |
| ISCA | Friedman Aligned | 2.50662E-06 | 7.71268E-06 | 7.71268E-06 | 7.71266E-06 |
| ISCA | Quade | 7.61417E-03 | 1.81029E-02 | 1.81029E-02 | 1.79562E-02 |
| DE | Friedman | 1.84419E-10 | 6.95118E-10 | 6.95118E-10 | 6.95118E-10 |
| DE | Friedman Aligned | 1.37739E-10 | 4.93071E-10 | 4.76787E-10 | 4.93071E-10 |
| DE | Quade | 6.18417E-02 | 2.16161E-01 | 2.16161E-01 | 1.98262E-01 |
| NNA | Friedman | 4.55458E-10 | 1.68169E-09 | 1.68169E-09 | 1.68169E-09 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 7.61417E-03 | 1.41024E-02 | 1.41024E-02 | 1.40116E-02 |
| **Table S109** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.92899E-09 | 6.67728E-09 | 6.67728E-09 | 6.67728E-09 |
| PSO | Friedman Aligned | 1.30815E-10 | 4.93071E-10 | 4.68469E-10 | 4.93071E-10 |
| PSO | Quade | 9.09831E-05 | 9.09869E-05 | 9.09869E-05 | 9.09831E-05 |
| NDE | Friedman | 4.08314E-06 | 1.25635E-05 | 1.25635E-05 | 1.25635E-05 |
| NDE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NDE | Quade | 1.22455E-01 | 3.82395E-01 | 3.82395E-01 | 3.30971E-01 |
| TLBO | Friedman | 1.18855E-01 | 3.04601E-01 | 3.04601E-01 | 2.74721E-01 |
| TLBO | Friedman Aligned | 3.01915E-04 | 7.66418E-04 | 7.66418E-04 | 7.66223E-04 |
| TLBO | Quade | 6.14412E-01 | 1.0 | 1.0 | 9.11000E-01 |
| EBLSHADE | Friedman | 9.04828E-01 | 1.0 | 1.0 | 9.86993E-01 |
| EBLSHADE | Friedman Aligned | 5.79889E-02 | 1.07300E-01 | 1.07300E-01 | 1.04422E-01 |
| EBLSHADE | Quade | 9.59583E-01 | 1.0 | 1.0 | 9.97324E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S110.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S110** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S111.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 6.27525E-04 | 6.27707E-04 | 6.27707E-04 | 6.27525E-04 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 6.31482E-01 | 9.60899E-01 | 9.60899E-01 | 6.31482E-01 |
| NNA | Friedman | 6.91741E-01 | 1.0 | 1.0 | 8.86116E-01 |
| NNA | Friedman Aligned | 3.06237E-11 | 5.65361E-11 | 5.65361E-11 | 5.65361E-11 |
| NNA | Quade | 9.96978E-01 | 1.0 | 1.0 | 9.99978E-01 |
| ISCA | Friedman | 7.77272E-01 | 1.0 | 1.0 | 9.77902E-01 |
| ISCA | Friedman Aligned | 5.16236E-07 | 1.31045E-06 | 1.31045E-06 | 1.31045E-06 |
| ISCA | Quade | 9.96978E-01 | 1.0 | 1.0 | 9.99989E-01 |
| WW | Friedman | 7.77272E-01 | 1.0 | 1.0 | 9.84073E-01 |
| WW | Friedman Aligned | 1.81771E-03 | 5.59646E-03 | 5.59646E-03 | 5.58239E-03 |
| WW | Quade | 9.96978E-01 | 1.0 | 1.0 | 9.99987E-01 |
| CWOA | Friedman | 9.25970E-01 | 1.0 | 1.0 | 9.99878E-01 |
| CWOA | Friedman Aligned | 9.53239E-01 | 1.0 | 1.0 | 9.99975E-01 |
| CWOA | Quade | 9.96978E-01 | 1.0 | 1.0 | 9.99998E-01 |
| GOTLBO | Friedman | 9.90942E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S111** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S112.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 3.32214E-02 | 3.37419E-02 | 3.37419E-02 | 3.32214E-02 |
| PSO | Friedman Aligned | 2.88658E-12 | 2.88658E-12 | 2.88658E-12 | 2.88658E-12 |
| PSO | Quade | 9.10497E-01 | 1.0 | 1.0 | 9.10497E-01 |
| NNA | Friedman | 9.99834E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 5.04334E-01 | 1.0 | 1.0 | 7.26301E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S112** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S113.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.22987E-02 | 9.64801E-02 | 9.64801E-02 | 9.22987E-02 |
| PSO | Friedman Aligned | 3.98146E-10 | 3.98146E-10 | 3.98146E-10 | 3.98146E-10 |
| PSO | Quade | 9.54610E-01 | 1.0 | 1.0 | 9.54610E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S113** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S114.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 4.36171E-03 | 4.37052E-03 | 4.37052E-03 | 4.36171E-03 |
| PSO | Friedman Aligned | 5.39684E-08 | 9.96340E-08 | 9.96340E-08 | 9.96340E-08 |
| PSO | Quade | 8.53378E-01 | 1.0 | 1.0 | 8.53378E-01 |
| NNA | Friedman | 9.47047E-01 | 1.0 | 1.0 | 9.95593E-01 |
| NNA | Friedman Aligned | 9.03118E-10 | 9.03118E-10 | 9.03118E-10 | 9.03118E-10 |
| NNA | Quade | 9.99981E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 9.73183E-01 | 1.0 | 1.0 | 9.99898E-01 |
| ISCA | Friedman Aligned | 4.17781E-06 | 1.06052E-05 | 1.06052E-05 | 1.06052E-05 |
| ISCA | Quade | 9.99981E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.73183E-01 | 1.0 | 1.0 | 9.99955E-01 |
| WW | Friedman Aligned | 7.30958E-03 | 2.25482E-02 | 2.25482E-02 | 2.23207E-02 |
| WW | Quade | 9.99981E-01 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S114** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S115.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, *R*s evaluation task). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 2.42446E-02 | 2.45202E-02 | 2.45202E-02 | 2.42446E-02 |
| PSO | Friedman Aligned | 3.88231E-08 | 3.88231E-08 | 3.88231E-08 | 3.88231E-08 |
| PSO | Quade | 9.32459E-01 | 1.0 | 1.0 | 9.32459E-01 |
| NNA | Friedman | 9.99213E-01 | 1.0 | 1.0 | 9.99998E-01 |
| NNA | Friedman Aligned | 3.27961E-03 | 6.06308E-03 | 6.06308E-03 | 6.04626E-03 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 9.99986E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 2.53096E-01 | 7.16378E-01 | 7.16378E-01 | 5.23253E-01 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S115** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S116.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 3.23303E-05 | 3.23308E-05 | 3.23308E-05 | 3.23303E-05 |
| WW | Friedman Aligned | 3.09062E-10 | 8.13039E-10 | 7.96436E-10 | 8.13039E-10 |
| WW | Quade | 7.59275E-01 | 1.0 | 1.0 | 7.97323E-01 |
| CWOA | Friedman | 1.22067E-04 | 2.25367E-04 | 2.25367E-04 | 2.25343E-04 |
| CWOA | Friedman Aligned | 3.09062E-10 | 7.84543E-10 | 7.65346E-10 | 7.84543E-10 |
| CWOA | Quade | 7.59275E-01 | 1.0 | 1.0 | 7.97323E-01 |
| NNA | Friedman | 1.53477E-04 | 3.89619E-04 | 3.89619E-04 | 3.89550E-04 |
| NNA | Friedman Aligned | 3.09062E-10 | 8.13039E-10 | 7.74680E-10 | 8.13039E-10 |
| NNA | Quade | 7.59275E-01 | 1.0 | 1.0 | 7.81433E-01 |
| ISCA | Friedman | 1.56918E-04 | 4.82851E-04 | 4.82851E-04 | 4.82746E-04 |
| ISCA | Friedman Aligned | 3.09062E-10 | 8.13039E-10 | 7.65346E-10 | 8.13039E-10 |
| ISCA | Quade | 7.59275E-01 | 1.0 | 1.0 | 7.59275E-01 |
| GOTLBO | Friedman | 2.31597E-03 | 8.02254E-03 | 8.02254E-03 | 7.99400E-03 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 7.59275E-01 | 1.0 | 1.0 | 9.45886E-01 |
| PSO | Friedman | 6.30413E-02 | 2.36852E-01 | 2.36852E-01 | 2.13709E-01 |
| PSO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| PSO | Quade | 8.41580E-01 | 1.0 | 1.0 | 9.98890E-01 |
| MABC | Friedman | 6.64164E-01 | 1.0 | 1.0 | 9.83637E-01 |
| MABC | Friedman Aligned | 3.09062E-10 | 8.13039E-10 | 7.65346E-10 | 8.13039E-10 |
| MABC | Quade | 9.59880E-01 | 1.0 | 1.0 | 9.99995E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S116** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S117.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 1.45556E-03 | 1.45654E-03 | 1.45654E-03 | 1.45556E-03 |
| NNA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.45556E-03 | 1.77232E-03 | 1.77232E-03 | 1.77088E-03 |
| CWOA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.45556E-03 | 2.10264E-03 | 2.10264E-03 | 2.10063E-03 |
| WW | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 1.45556E-03 | 2.18579E-03 | 2.18579E-03 | 2.18364E-03 |
| MABC | Friedman | 1.41904E-12 | 4.91207E-12 | 4.91207E-12 | 4.91207E-12 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 2.56699E-02 | 9.73363E-02 | 9.73363E-02 | 9.33686E-02 |
| PSO | Friedman | 4.78499E-12 | 1.76676E-11 | 1.76676E-11 | 1.76676E-11 |
| PSO | Friedman Aligned | 1.80279E-10 | 6.65645E-10 | 6.65645E-10 | 6.65645E-10 |
| PSO | Quade | 1.10383E-02 | 4.08787E-02 | 4.08787E-02 | 4.01550E-02 |
| DE | Friedman | 1.99447E-10 | 7.51762E-10 | 7.51762E-10 | 7.51762E-10 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 4.08670E-02 | 1.52102E-01 | 1.52102E-01 | 1.42782E-01 |
| GOTLBO | Friedman | 1.22587E-09 | 4.52629E-09 | 4.52629E-09 | 4.52629E-09 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 2.30921E-03 | 7.99910E-03 | 7.99910E-03 | 7.97072E-03 |
| **Table S117** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.01726E-06 | 3.52129E-06 | 3.52129E-06 | 3.52128E-06 |
| IJAYA | Friedman Aligned | 3.40542E-06 | 1.17880E-05 | 1.17880E-05 | 1.17879E-05 |
| IJAYA | Quade | 1.25398E-01 | 4.42937E-01 | 4.42937E-01 | 3.71110E-01 |
| NDE | Friedman | 3.37287E-03 | 1.03821E-02 | 1.03821E-02 | 1.03418E-02 |
| NDE | Friedman Aligned | 1.50714E-02 | 4.64546E-02 | 4.64546E-02 | 4.56516E-02 |
| NDE | Quade | 3.66833E-01 | 1.0 | 1.0 | 7.54932E-01 |
| TLBO | Friedman | 4.20792E-01 | 1.0 | 1.0 | 7.49986E-01 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 7.93916E-01 | 1.0 | 1.0 | 9.81856E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S118.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 1.09625E-03 | 1.09680E-03 | 1.09680E-03 | 1.09625E-03 |
| NNA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.09625E-03 | 1.34054E-03 | 1.34054E-03 | 1.33971E-03 |
| CWOA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.09625E-03 | 1.59708E-03 | 1.59708E-03 | 1.59592E-03 |
| MABC | Friedman | 2.33813E-13 | 7.19425E-13 | 7.19425E-13 | 7.19425E-13 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 2.11738E-02 | 8.02031E-02 | 8.02031E-02 | 7.74983E-02 |
| PSO | Friedman | 2.85766E-11 | 9.89189E-11 | 9.89189E-11 | 9.89189E-11 |
| PSO | Friedman Aligned | 1.82294E-10 | 6.73084E-10 | 6.73084E-10 | 6.73084E-10 |
| PSO | Quade | 8.90739E-03 | 3.29680E-02 | 3.29680E-02 | 3.24964E-02 |
| DE | Friedman | 3.71229E-11 | 1.37069E-10 | 1.37069E-10 | 1.37069E-10 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 3.41907E-02 | 1.27086E-01 | 1.27086E-01 | 1.20544E-01 |
| WW | Friedman | 3.79121E-10 | 1.42899E-09 | 1.42899E-09 | 1.42899E-09 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 1.09625E-03 | 1.66392E-03 | 1.66392E-03 | 1.66267E-03 |
| GOTLBO | Friedman | 3.71983E-09 | 1.37348E-08 | 1.37348E-08 | 1.37348E-08 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.80120E-03 | 6.23839E-03 | 6.23839E-03 | 6.22112E-03 |
| **Table S118** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 2.38212E-07 | 8.24579E-07 | 8.24579E-07 | 8.24578E-07 |
| IJAYA | Friedman Aligned | 1.92652E-06 | 6.66873E-06 | 6.66873E-06 | 6.66871E-06 |
| IJAYA | Quade | 1.08536E-01 | 3.82291E-01 | 3.82291E-01 | 3.28134E-01 |
| NDE | Friedman | 1.31676E-03 | 4.05218E-03 | 4.05218E-03 | 4.04603E-03 |
| NDE | Friedman Aligned | 1.08197E-02 | 3.33332E-02 | 3.33332E-02 | 3.29189E-02 |
| NDE | Quade | 3.30743E-01 | 1.0 | 1.0 | 7.09355E-01 |
| TLBO | Friedman | 2.78642E-01 | 7.24406E-01 | 7.24406E-01 | 5.63564E-01 |
| TLBO | Friedman Aligned | 9.40972E-01 | 1.0 | 1.0 | 9.99241E-01 |
| TLBO | Quade | 7.45664E-01 | 1.0 | 1.0 | 9.69051E-01 |
| EBLSHADE | Friedman | 8.09315E-01 | 1.0 | 1.0 | 9.53081E-01 |
| EBLSHADE | Friedman Aligned | 9.40972E-01 | 1.0 | 1.0 | 9.99241E-01 |
| EBLSHADE | Quade | 9.56989E-01 | 1.0 | 1.0 | 9.96998E-01 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S119.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| CWOA | Friedman | 2.04947E-13 | 2.04947E-13 | 2.04947E-13 | 2.04947E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 6.08936E-02 | 7.94811E-02 | 7.94811E-02 | 7.66710E-02 |
| NNA | Friedman | 2.51132E-13 | 4.63629E-13 | 4.63629E-13 | 4.63629E-13 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 6.08936E-02 | 7.13516E-02 | 7.13516E-02 | 6.90638E-02 |
| ISCA | Friedman | 2.84809E-13 | 7.22977E-13 | 7.22977E-13 | 7.22977E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 6.08936E-02 | 6.26749E-02 | 6.26749E-02 | 6.08936E-02 |
| WW | Friedman | 2.98039E-13 | 9.17044E-13 | 9.17044E-13 | 9.17044E-13 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 6.08936E-02 | 7.99347E-02 | 7.99347E-02 | 7.71198E-02 |
| GOTLBO | Friedman | 3.48809E-11 | 1.20741E-10 | 1.20741E-10 | 1.20741E-10 |
| GOTLBO | Friedman Aligned | 1.79116E-10 | 6.61351E-10 | 6.61351E-10 | 6.61351E-10 |
| GOTLBO | Quade | 6.08936E-02 | 2.03799E-01 | 2.03799E-01 | 1.86283E-01 |
| PSO | Friedman | 4.01794E-08 | 1.48355E-07 | 1.48355E-07 | 1.48355E-07 |
| PSO | Friedman Aligned | 1.19200E-10 | 4.49293E-10 | 4.49293E-10 | 4.49293E-10 |
| PSO | Quade | 1.63536E-01 | 6.32903E-01 | 6.32903E-01 | 4.82809E-01 |
| MABC | Friedman | 4.55403E-05 | 1.71654E-04 | 1.71654E-04 | 1.71641E-04 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 2.71658E-01 | 1.0 | 1.0 | 6.97232E-01 |
| DE | Friedman | 8.96693E-04 | 3.31144E-03 | 3.31144E-03 | 3.30687E-03 |
| DE | Friedman Aligned | 1.27875E-12 | 4.72156E-12 | 4.72156E-12 | 4.72156E-12 |
| DE | Quade | 3.50621E-01 | 1.0 | 1.0 | 7.96911E-01 |
| **Table S119** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 7.33717E-02 | 2.56942E-01 | 2.56942E-01 | 2.31857E-01 |
| IJAYA | Friedman Aligned | 4.02808E-02 | 1.40313E-01 | 1.40313E-01 | 1.32656E-01 |
| IJAYA | Quade | 6.43209E-01 | 1.0 | 1.0 | 9.71773E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S120.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.04014E-03 | 1.04064E-03 | 1.04064E-03 | 1.04014E-03 |
| WW | Friedman Aligned | 3.59772E-11 | 1.24536E-10 | 1.24536E-10 | 1.24536E-10 |
| WW | Quade | 8.97219E-01 | 1.0 | 1.0 | 9.18511E-01 |
| CWOA | Friedman | 2.86600E-03 | 5.29751E-03 | 5.29751E-03 | 5.28467E-03 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 8.97219E-01 | 1.0 | 1.0 | 9.18511E-01 |
| ISCA | Friedman | 3.24679E-03 | 9.70884E-03 | 9.70884E-03 | 9.66653E-03 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 8.97219E-01 | 1.0 | 1.0 | 8.97219E-01 |
| NNA | Friedman | 3.24679E-03 | 8.25217E-03 | 8.25217E-03 | 8.22129E-03 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 8.97219E-01 | 1.0 | 1.0 | 9.09994E-01 |
| GOTLBO | Friedman | 2.71581E-02 | 9.48059E-02 | 9.48059E-02 | 9.09078E-02 |
| GOTLBO | Friedman Aligned | 1.40579E-09 | 5.19061E-09 | 5.19061E-09 | 5.19061E-09 |
| GOTLBO | Quade | 8.97219E-01 | 1.0 | 1.0 | 9.87898E-01 |
| PSO | Friedman | 3.11831E-01 | 1.0 | 1.0 | 7.48395E-01 |
| PSO | Friedman Aligned | 1.73195E-13 | 5.32907E-13 | 5.32907E-13 | 5.32907E-13 |
| PSO | Quade | 9.43078E-01 | 1.0 | 1.0 | 9.99975E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S120** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S121.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.96287E-13 | 1.96287E-13 | 1.96287E-13 | 1.96287E-13 |
| PSO | Friedman Aligned | 1.80688E-10 | 6.67154E-10 | 6.67154E-10 | 6.67154E-10 |
| PSO | Quade | 2.94896E-02 | 1.09763E-01 | 1.09763E-01 | 1.04634E-01 |
| GOTLBO | Friedman | 6.25031E-11 | 1.15390E-10 | 1.15390E-10 | 1.15390E-10 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 7.28397E-03 | 2.52705E-02 | 2.52705E-02 | 2.49885E-02 |
| MABC | Friedman | 1.09197E-09 | 2.77193E-09 | 2.77193E-09 | 2.77193E-09 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 6.15993E-02 | 2.35585E-01 | 2.35585E-01 | 2.13090E-01 |
| ISCA | Friedman | 1.25475E-09 | 3.86077E-09 | 3.86077E-09 | 3.86077E-09 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 5.44202E-03 | 5.45574E-03 | 5.45574E-03 | 5.44202E-03 |
| NNA | Friedman | 1.37295E-09 | 4.75250E-09 | 4.75250E-09 | 4.75250E-09 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 5.44202E-03 | 6.49673E-03 | 6.49673E-03 | 6.47742E-03 |
| CWOA | Friedman | 2.09713E-09 | 7.74326E-09 | 7.74326E-09 | 7.74326E-09 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 5.44202E-03 | 7.55156E-03 | 7.55156E-03 | 7.52569E-03 |
| WW | Friedman | 9.53069E-09 | 3.59234E-08 | 3.59234E-08 | 3.59234E-08 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 5.44202E-03 | 7.76630E-03 | 7.76630E-03 | 7.73921E-03 |
| DE | Friedman | 4.24571E-08 | 1.56765E-07 | 1.56765E-07 | 1.56765E-07 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 9.15391E-02 | 3.44207E-01 | 3.44207E-01 | 2.98458E-01 |
| **Table S121** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 6.97445E-05 | 2.41426E-04 | 2.41426E-04 | 2.41402E-04 |
| IJAYA | Friedman Aligned | 3.05560E-06 | 1.05771E-05 | 1.05771E-05 | 1.05770E-05 |
| IJAYA | Quade | 2.37971E-01 | 8.57542E-01 | 8.57542E-01 | 6.09662E-01 |
| NDE | Friedman | 4.44651E-02 | 1.37531E-01 | 1.37531E-01 | 1.30599E-01 |
| NDE | Friedman Aligned | 1.41555E-02 | 4.36271E-02 | 4.36271E-02 | 4.29185E-02 |
| NDE | Quade | 5.71073E-01 | 1.0 | 1.0 | 9.26061E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 9.91583E-01 | 1.0 | 1.0 | 9.99995E-01 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S122.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 9.04976E-01 | 1.0 | 1.0 | 9.04976E-01 |
| WW | Friedman Aligned | 1.67999E-12 | 1.67999E-12 | 1.67999E-12 | 1.67999E-12 |
| WW | Quade | 9.99991E-01 | 1.0 | 1.0 | 9.99997E-01 |
| ISCA | Friedman | 9.32174E-01 | 1.0 | 1.0 | 9.97839E-01 |
| ISCA | Friedman Aligned | 7.66599E-08 | 1.94598E-07 | 1.94598E-07 | 1.94598E-07 |
| ISCA | Quade | 9.99991E-01 | 1.0 | 1.0 | 9.99991E-01 |
| NNA | Friedman | 9.32174E-01 | 1.0 | 1.0 | 9.97323E-01 |
| NNA | Friedman Aligned | 3.08669E-09 | 5.69850E-09 | 5.69850E-09 | 5.69850E-09 |
| NNA | Quade | 9.99991E-01 | 1.0 | 1.0 | 9.99995E-01 |
| CWOA | Friedman | 9.32174E-01 | 1.0 | 1.0 | 9.93041E-01 |
| CWOA | Friedman Aligned | 2.23479E-06 | 6.87627E-06 | 6.87627E-06 | 6.87625E-06 |
| CWOA | Quade | 9.99991E-01 | 1.0 | 1.0 | 9.99997E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S122** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S123.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ISCA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 1.09625E-03 | 1.09680E-03 | 1.09680E-03 | 1.09625E-03 |
| NNA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 1.09625E-03 | 1.34054E-03 | 1.34054E-03 | 1.33971E-03 |
| CWOA | Friedman | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 1.09625E-03 | 1.59708E-03 | 1.59708E-03 | 1.59592E-03 |
| MABC | Friedman | 2.33813E-13 | 7.19425E-13 | 7.19425E-13 | 7.19425E-13 |
| MABC | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| MABC | Quade | 2.11738E-02 | 8.02031E-02 | 8.02031E-02 | 7.74983E-02 |
| PSO | Friedman | 2.85766E-11 | 9.89189E-11 | 9.89189E-11 | 9.89189E-11 |
| PSO | Friedman Aligned | 1.82294E-10 | 6.73084E-10 | 6.73084E-10 | 6.73084E-10 |
| PSO | Quade | 8.90739E-03 | 3.29680E-02 | 3.29680E-02 | 3.24964E-02 |
| DE | Friedman | 3.71229E-11 | 1.37069E-10 | 1.37069E-10 | 1.37069E-10 |
| DE | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| DE | Quade | 3.41907E-02 | 1.27086E-01 | 1.27086E-01 | 1.20544E-01 |
| WW | Friedman | 3.79121E-10 | 1.42899E-09 | 1.42899E-09 | 1.42899E-09 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 1.09625E-03 | 1.66392E-03 | 1.66392E-03 | 1.66267E-03 |
| GOTLBO | Friedman | 3.71983E-09 | 1.37348E-08 | 1.37348E-08 | 1.37348E-08 |
| GOTLBO | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| GOTLBO | Quade | 1.80120E-03 | 6.23839E-03 | 6.23839E-03 | 6.22112E-03 |
| **Table S123** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 2.38212E-07 | 8.24579E-07 | 8.24579E-07 | 8.24578E-07 |
| IJAYA | Friedman Aligned | 1.92652E-06 | 6.66873E-06 | 6.66873E-06 | 6.66871E-06 |
| IJAYA | Quade | 1.08536E-01 | 3.82291E-01 | 3.82291E-01 | 3.28134E-01 |
| NDE | Friedman | 1.31676E-03 | 4.05218E-03 | 4.05218E-03 | 4.04603E-03 |
| NDE | Friedman Aligned | 1.08197E-02 | 3.33332E-02 | 3.33332E-02 | 3.29189E-02 |
| NDE | Quade | 3.30743E-01 | 1.0 | 1.0 | 7.09355E-01 |
| TLBO | Friedman | 2.78642E-01 | 7.24406E-01 | 7.24406E-01 | 5.63564E-01 |
| TLBO | Friedman Aligned | 9.40972E-01 | 1.0 | 1.0 | 9.99241E-01 |
| TLBO | Quade | 7.45664E-01 | 1.0 | 1.0 | 9.69051E-01 |
| EBLSHADE | Friedman | 8.09315E-01 | 1.0 | 1.0 | 9.53081E-01 |
| EBLSHADE | Friedman Aligned | 9.40972E-01 | 1.0 | 1.0 | 9.99241E-01 |
| EBLSHADE | Quade | 9.56989E-01 | 1.0 | 1.0 | 9.96998E-01 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S124.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 1.37121E-01 | 1.46648E-01 | 1.46648E-01 | 1.37121E-01 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 9.87878E-01 | 1.0 | 1.0 | 9.91564E-01 |
| ISCA | Friedman | 2.08923E-01 | 5.89641E-01 | 5.89641E-01 | 4.55419E-01 |
| ISCA | Friedman Aligned | 7.82109E-10 | 1.98535E-09 | 1.98535E-09 | 1.98535E-09 |
| ISCA | Quade | 9.87878E-01 | 1.0 | 1.0 | 9.87878E-01 |
| NNA | Friedman | 2.08923E-01 | 5.49729E-01 | 5.49729E-01 | 4.31038E-01 |
| NNA | Friedman Aligned | 7.43077E-09 | 2.28639E-08 | 2.28639E-08 | 2.28639E-08 |
| NNA | Quade | 9.87878E-01 | 1.0 | 1.0 | 9.90189E-01 |
| CWOA | Friedman | 2.08923E-01 | 4.24958E-01 | 4.24958E-01 | 3.51222E-01 |
| CWOA | Friedman Aligned | 3.54082E-11 | 6.53690E-11 | 6.53690E-11 | 6.53690E-11 |
| CWOA | Quade | 9.87878E-01 | 1.0 | 1.0 | 9.91564E-01 |
| GOTLBO | Friedman | 5.28655E-01 | 1.0 | 1.0 | 9.25997E-01 |
| GOTLBO | Friedman Aligned | 3.35675E-04 | 1.16207E-03 | 1.16207E-03 | 1.16147E-03 |
| GOTLBO | Quade | 9.87878E-01 | 1.0 | 1.0 | 9.99741E-01 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S124** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S125.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 7.01424E-09 | 7.01424E-09 | 7.01424E-09 | 7.01424E-09 |
| WW | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| WW | Quade | 3.33895E-01 | 4.68680E-01 | 4.61937E-01 | 3.80571E-01 |
| CWOA | Friedman | 4.86623E-08 | 8.98381E-08 | 8.98381E-08 | 8.98381E-08 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 3.33895E-01 | 4.68680E-01 | 4.61937E-01 | 3.80571E-01 |
| NNA | Friedman | 7.50035E-08 | 1.90393E-07 | 1.90393E-07 | 1.90393E-07 |
| NNA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| NNA | Quade | 3.33895E-01 | 4.37241E-01 | 4.37241E-01 | 3.59435E-01 |
| ISCA | Friedman | 8.49143E-08 | 2.61275E-07 | 2.61275E-07 | 2.61275E-07 |
| ISCA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| ISCA | Quade | 3.33895E-01 | 4.00024E-01 | 4.00024E-01 | 3.33895E-01 |
| GOTLBO | Friedman | 3.57285E-06 | 1.23676E-05 | 1.23676E-05 | 1.23675E-05 |
| GOTLBO | Friedman Aligned | 2.09884E-10 | 7.74957E-10 | 7.74957E-10 | 7.74957E-10 |
| GOTLBO | Quade | 3.33895E-01 | 9.45824E-01 | 9.45824E-01 | 6.31865E-01 |
| PSO | Friedman | 5.02694E-04 | 1.85635E-03 | 1.85635E-03 | 1.85485E-03 |
| PSO | Friedman Aligned | 7.43825E-11 | 2.57478E-10 | 2.57478E-10 | 2.57478E-10 |
| PSO | Quade | 4.98202E-01 | 1.0 | 1.0 | 9.21610E-01 |
| MABC | Friedman | 4.25676E-02 | 1.62057E-01 | 1.62057E-01 | 1.51226E-01 |
| MABC | Friedman Aligned | 6.05896E-09 | 2.23716E-08 | 2.23716E-08 | 2.23716E-08 |
| MABC | Quade | 6.69600E-01 | 1.0 | 1.0 | 9.84613E-01 |
| DE | Friedman | 2.05603E-01 | 7.92421E-01 | 7.92421E-01 | 5.72528E-01 |
| DE | Friedman Aligned | 8.71728E-10 | 3.28574E-09 | 3.28574E-09 | 3.28574E-09 |
| DE | Quade | 7.68822E-01 | 1.0 | 1.0 | 9.95518E-01 |
| **Table S125** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S126.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 9.99926E-01 | 1.0 | 1.0 | 9.99926E-01 |
| WW | Friedman Aligned | 6.29593E-01 | 9.56165E-01 | 9.56165E-01 | 6.29593E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.99990E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.99996E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 9.94434E-01 | 1.0 | 1.0 | 9.99931E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S126** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S127.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 9.99981E-01 | 1.0 | 1.0 | 9.99981E-01 |
| WW | Friedman Aligned | 9.68408E-01 | 1.0 | 1.0 | 9.68408E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.99999E-01 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S127** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S128.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| WW | Friedman | 9.99999E-01 | 1.0 | 1.0 | 9.99999E-01 |
| WW | Friedman Aligned | 1.65346E-01 | 1.79488E-01 | 1.79488E-01 | 1.65346E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S128** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 9.50839E-01 | 1.0 | 1.0 | 9.99523E-01 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 7.72845E-01 | 1.0 | 1.0 | 9.35186E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S129.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, RMSPE value). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S129** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S130.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (DE is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 4.50560E-01 | 7.36426E-01 | 7.16850E-01 | 5.32330E-01 |
| PSO | Friedman Aligned | 1.31972E-02 | 4.07936E-02 | 4.07936E-02 | 4.00528E-02 |
| PSO | Quade | 9.99988E-01 | 1.0 | 1.0 | 9.99998E-01 |
| CWOA | Friedman | 4.50560E-01 | 7.36426E-01 | 7.16850E-01 | 5.32330E-01 |
| CWOA | Friedman Aligned | 2.07247E-05 | 3.82613E-05 | 3.82613E-05 | 3.82606E-05 |
| CWOA | Quade | 9.99988E-01 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 4.50560E-01 | 5.85271E-01 | 5.85271E-01 | 4.50560E-01 |
| WW | Friedman Aligned | 2.92524E-07 | 2.92524E-07 | 2.92524E-07 | 2.92524E-07 |
| WW | Quade | 9.99988E-01 | 1.0 | 1.0 | 9.99988E-01 |
| GOTLBO | Friedman | 5.52020E-01 | 1.0 | 1.0 | 9.15482E-01 |
| GOTLBO | Friedman Aligned | 7.67176E-01 | 1.0 | 1.0 | 9.95399E-01 |
| GOTLBO | Quade | 9.99988E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 5.52020E-01 | 1.0 | 1.0 | 9.15482E-01 |
| NNA | Friedman Aligned | 6.53162E-04 | 1.65844E-03 | 1.65844E-03 | 1.65719E-03 |
| NNA | Quade | 9.99988E-01 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 5.52204E-01 | 1.0 | 1.0 | 9.48515E-01 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 9.99988E-01 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 8.42576E-01 | 1.0 | 1.0 | 9.99059E-01 |
| MABC | Friedman Aligned | 4.90703E-01 | 1.0 | 1.0 | 9.03246E-01 |
| MABC | Quade | 9.99988E-01 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 8.42576E-01 | 1.0 | 1.0 | 9.99059E-01 |
| IJAYA | Friedman Aligned | 9.62004E-01 | 1.0 | 1.0 | 9.99996E-01 |
| IJAYA | Quade | 9.99988E-01 | 1.0 | 1.0 | 1.0 |
| **Table S130** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S131.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (EBLSHADE is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.30508E-05 | 2.46344E-05 | 2.46344E-05 | 2.46341E-05 |
| PSO | Friedman Aligned | 4.90853E-11 | 1.24601E-10 | 1.24601E-10 | 1.24601E-10 |
| PSO | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 8.40980E-01 |
| CWOA | Friedman | 1.30508E-05 | 2.35507E-05 | 2.35507E-05 | 2.35504E-05 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 8.86126E-01 |
| WW | Friedman | 1.30508E-05 | 1.30509E-05 | 1.30509E-05 | 1.30508E-05 |
| WW | Friedman Aligned | 8.76076E-10 | 3.03257E-09 | 3.03257E-09 | 3.03257E-09 |
| WW | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 7.93250E-01 |
| NNA | Friedman | 1.25380E-04 | 3.85802E-04 | 3.85802E-04 | 3.85735E-04 |
| NNA | Friedman Aligned | 1.73171E-09 | 6.52721E-09 | 6.52721E-09 | 6.52721E-09 |
| NNA | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| GOTLBO | Friedman | 1.26295E-04 | 4.37193E-04 | 4.37193E-04 | 4.37109E-04 |
| GOTLBO | Friedman Aligned | 5.58257E-11 | 1.71771E-10 | 1.71771E-10 | 1.71771E-10 |
| GOTLBO | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| ISCA | Friedman | 2.06680E-04 | 7.63167E-04 | 7.63167E-04 | 7.62912E-04 |
| ISCA | Friedman Aligned | 1.83740E-08 | 6.36024E-08 | 6.36024E-08 | 6.36024E-08 |
| ISCA | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| MABC | Friedman | 1.40828E-03 | 5.30987E-03 | 4.55132E-03 | 5.29780E-03 |
| MABC | Friedman Aligned | 3.00493E-12 | 5.54756E-12 | 5.54756E-12 | 5.54756E-12 |
| MABC | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| IJAYA | Friedman | 1.40828E-03 | 5.30987E-03 | 4.55132E-03 | 5.29780E-03 |
| IJAYA | Friedman Aligned | 8.76076E-10 | 3.10840E-09 | 3.10840E-09 | 3.10840E-09 |
| IJAYA | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| **Table S131** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 5.62340E-03 | 1.94825E-02 | 1.94825E-02 | 1.93313E-02 |
| DE | Friedman Aligned | 2.45853E-09 | 9.07765E-09 | 9.07765E-09 | 9.07765E-09 |
| DE | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| NDE | Friedman | 2.09529E-02 | 6.46277E-02 | 6.46277E-02 | 6.30782E-02 |
| NDE | Friedman Aligned | 2.37713E-02 | 7.33451E-02 | 5.14343E-02 | 7.13523E-02 |
| NDE | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.19984E-01 |
| TLBO | Friedman | 3.98503E-01 | 1.0 | 4.07382E-01 | 7.24836E-01 |
| TLBO | Friedman Aligned | 2.88150E-02 | 7.33451E-02 | 5.14343E-02 | 7.15329E-02 |
| TLBO | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.77197E-01 |
| STLBO | Friedman | 3.98503E-01 | 1.0 | 4.07382E-01 | 7.24836E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 7.98639E-01 | 1.0 | 7.98639E-01 | 9.77197E-01 |
| ADELI | Friedman | 4.07382E-01 | 1.0 | 4.07382E-01 | 7.24836E-01 |
| ADELI | Friedman Aligned | 2.88150E-02 | 7.33451E-02 | 5.14343E-02 | 7.15329E-02 |
| ADELI | Quade | 7.93250E-01 | 1.0 | 7.98639E-01 | 9.77197E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S132.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ADELI is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 6.31318E-04 | 1.04935E-03 | 1.04935E-03 | 1.04885E-03 |
| PSO | Friedman Aligned | 1.18842E-10 | 3.01677E-10 | 3.01677E-10 | 3.01677E-10 |
| PSO | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.76795E-01 |
| CWOA | Friedman | 6.31318E-04 | 1.02471E-03 | 1.02471E-03 | 1.02423E-03 |
| CWOA | Friedman Aligned | 4.50306E-12 | 8.31335E-12 | 8.31335E-12 | 8.31335E-12 |
| CWOA | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.87201E-01 |
| WW | Friedman | 6.31318E-04 | 6.31502E-04 | 6.31502E-04 | 6.31318E-04 |
| WW | Friedman Aligned | 4.21371E-10 | 1.29653E-09 | 1.29653E-09 | 1.29653E-09 |
| WW | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.62893E-01 |
| GOTLBO | Friedman | 3.28358E-03 | 1.09916E-02 | 1.09916E-02 | 1.09381E-02 |
| GOTLBO | Friedman Aligned | 1.53943E-05 | 5.68406E-05 | 5.68406E-05 | 5.68392E-05 |
| GOTLBO | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| NNA | Friedman | 3.28358E-03 | 1.01148E-02 | 1.01148E-02 | 1.00689E-02 |
| NNA | Friedman Aligned | 5.08038E-13 | 5.08038E-13 | 5.08038E-13 | 5.08038E-13 |
| NNA | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| ISCA | Friedman | 4.57816E-03 | 1.69249E-02 | 1.69249E-02 | 1.68001E-02 |
| ISCA | Friedman Aligned | 8.26661E-04 | 2.86188E-03 | 2.86188E-03 | 2.85861E-03 |
| ISCA | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| MABC | Friedman | 2.05485E-02 | 7.78229E-02 | 6.67054E-02 | 7.52749E-02 |
| MABC | Friedman Aligned | 1.46218E-06 | 5.06140E-06 | 5.06140E-06 | 5.06139E-06 |
| MABC | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| IJAYA | Friedman | 2.05485E-02 | 7.78229E-02 | 6.67054E-02 | 7.52749E-02 |
| IJAYA | Friedman Aligned | 1.09560E-04 | 4.12967E-04 | 4.12967E-04 | 4.12893E-04 |
| IJAYA | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| **Table S132** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 5.66909E-02 | 1.97993E-01 | 1.97993E-01 | 1.82921E-01 |
| DE | Friedman Aligned | 2.35433E-04 | 8.69330E-04 | 8.69330E-04 | 8.69015E-04 |
| DE | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| NDE | Friedman | 1.46638E-01 | 4.59328E-01 | 4.59328E-01 | 3.86093E-01 |
| NDE | Friedman Aligned | 9.58524E-01 | 1.0 | 1.0 | 9.99944E-01 |
| NDE | Quade | 9.62893E-01 | 1.0 | 1.0 | 9.93168E-01 |
| TLBO | Friedman | 9.45602E-01 | 1.0 | 1.0 | 9.99383E-01 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 9.49185E-01 | 1.0 | 1.0 | 9.99383E-01 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S133.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NDE is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.55714E-01 | 2.24134E-01 | 2.20690E-01 | 2.02484E-01 |
| PSO | Friedman Aligned | 2.45681E-10 | 6.23651E-10 | 6.23651E-10 | 6.23651E-10 |
| PSO | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99926E-01 |
| CWOA | Friedman | 1.55714E-01 | 2.24134E-01 | 2.20690E-01 | 2.02484E-01 |
| CWOA | Friedman Aligned | 2.18658E-12 | 4.03677E-12 | 4.03677E-12 | 4.03677E-12 |
| CWOA | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99984E-01 |
| WW | Friedman | 1.55714E-01 | 1.68167E-01 | 1.68167E-01 | 1.55714E-01 |
| WW | Friedman Aligned | 2.49057E-10 | 7.66329E-10 | 7.66329E-10 | 7.66329E-10 |
| WW | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99775E-01 |
| GOTLBO | Friedman | 2.56546E-01 | 8.77639E-01 | 8.77639E-01 | 6.02847E-01 |
| GOTLBO | Friedman Aligned | 2.54839E-05 | 9.40951E-05 | 9.40951E-05 | 9.40913E-05 |
| GOTLBO | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99998E-01 |
| NNA | Friedman | 2.56546E-01 | 8.71786E-01 | 8.71786E-01 | 5.98341E-01 |
| NNA | Friedman Aligned | 1.12288E-12 | 1.12288E-12 | 1.12288E-12 | 1.12288E-12 |
| NNA | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99998E-01 |
| ISCA | Friedman | 2.68694E-01 | 1.0 | 1.0 | 6.85071E-01 |
| ISCA | Friedman Aligned | 1.22826E-03 | 4.25249E-03 | 4.25249E-03 | 4.24526E-03 |
| ISCA | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99998E-01 |
| MABC | Friedman | 5.32517E-01 | 1.0 | 1.0 | 9.43079E-01 |
| MABC | Friedman Aligned | 2.55400E-06 | 8.84079E-06 | 8.84079E-06 | 8.84076E-06 |
| MABC | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99998E-01 |
| IJAYA | Friedman | 5.32517E-01 | 1.0 | 1.0 | 9.43079E-01 |
| IJAYA | Friedman Aligned | 1.72659E-04 | 6.50817E-04 | 6.50817E-04 | 6.50635E-04 |
| IJAYA | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99998E-01 |
| **Table S133** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 7.62590E-01 | 1.0 | 1.0 | 9.93109E-01 |
| DE | Friedman Aligned | 3.62802E-04 | 1.33967E-03 | 1.33967E-03 | 1.33892E-03 |
| DE | Quade | 9.99775E-01 | 1.0 | 1.0 | 9.99998E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S134.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (MABC is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 8.30603E-01 | 1.0 | 1.0 | 8.84463E-01 |
| PSO | Friedman Aligned | 2.77918E-01 | 9.53341E-01 | 9.53341E-01 | 6.32817E-01 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 8.30603E-01 | 1.0 | 1.0 | 8.84463E-01 |
| CWOA | Friedman Aligned | 3.58148E-03 | 6.62200E-03 | 6.62200E-03 | 6.60193E-03 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 8.30603E-01 | 1.0 | 1.0 | 8.30603E-01 |
| WW | Friedman Aligned | 1.46115E-04 | 1.46124E-04 | 1.46124E-04 | 1.46115E-04 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 8.60298E-01 | 1.0 | 1.0 | 9.97657E-01 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 8.60298E-01 | 1.0 | 1.0 | 9.99247E-01 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 8.60298E-01 | 1.0 | 1.0 | 9.97657E-01 |
| NNA | Friedman Aligned | 4.14291E-02 | 1.06884E-01 | 1.06884E-01 | 1.01840E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S134** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S135.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (TLBO is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.92560E-04 | 1.62336E-03 | 1.62336E-03 | 1.62216E-03 |
| PSO | Friedman Aligned | 1.04019E-10 | 2.64048E-10 | 2.64048E-10 | 2.64048E-10 |
| PSO | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.76514E-01 |
| CWOA | Friedman | 9.92560E-04 | 1.58954E-03 | 1.58954E-03 | 1.58839E-03 |
| CWOA | Friedman Aligned | 5.11791E-12 | 9.44844E-12 | 9.44844E-12 | 9.44844E-12 |
| CWOA | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.87026E-01 |
| WW | Friedman | 9.92560E-04 | 9.93015E-04 | 9.93015E-04 | 9.92560E-04 |
| WW | Friedman Aligned | 4.62743E-10 | 1.42383E-09 | 1.42383E-09 | 1.42383E-09 |
| WW | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.62491E-01 |
| GOTLBO | Friedman | 4.77179E-03 | 1.58963E-02 | 1.58963E-02 | 1.57845E-02 |
| GOTLBO | Friedman Aligned | 1.40291E-05 | 5.17999E-05 | 5.17999E-05 | 5.17987E-05 |
| GOTLBO | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| NNA | Friedman | 4.77179E-03 | 1.47067E-02 | 1.47067E-02 | 1.46098E-02 |
| NNA | Friedman Aligned | 4.38760E-13 | 4.38760E-13 | 4.38760E-13 | 4.38760E-13 |
| NNA | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| ISCA | Friedman | 6.51265E-03 | 2.40890E-02 | 2.40890E-02 | 2.38367E-02 |
| ISCA | Friedman Aligned | 7.68321E-04 | 2.65989E-03 | 2.65989E-03 | 2.65706E-03 |
| ISCA | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| MABC | Friedman | 2.77009E-02 | 1.05088E-01 | 9.00750E-02 | 1.00471E-01 |
| MABC | Friedman Aligned | 1.31956E-06 | 4.56772E-06 | 4.56772E-06 | 4.56771E-06 |
| MABC | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| IJAYA | Friedman | 2.77009E-02 | 1.05088E-01 | 9.00750E-02 | 1.00471E-01 |
| IJAYA | Friedman Aligned | 1.00742E-04 | 3.79729E-04 | 3.79729E-04 | 3.79667E-04 |
| IJAYA | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| **Table S135** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 7.29030E-02 | 2.55281E-01 | 2.55281E-01 | 2.30511E-01 |
| DE | Friedman Aligned | 2.17370E-04 | 8.02629E-04 | 8.02629E-04 | 8.02360E-04 |
| DE | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| NDE | Friedman | 1.80006E-01 | 5.66315E-01 | 5.66315E-01 | 4.56998E-01 |
| NDE | Friedman Aligned | 9.48516E-01 | 1.0 | 1.0 | 9.99891E-01 |
| NDE | Quade | 9.62491E-01 | 1.0 | 1.0 | 9.93062E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 9.92596E-01 | 1.0 | 1.0 | 9.99996E-01 |
| ADELI | Quade | 9.99595E-01 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S136.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (GOTLBO is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.98888E-01 | 1.0 | 1.0 | 9.99669E-01 |
| PSO | Friedman Aligned | 9.17453E-02 | 2.91753E-01 | 2.91753E-01 | 2.56282E-01 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.98888E-01 | 1.0 | 1.0 | 9.99669E-01 |
| CWOA | Friedman Aligned | 4.72107E-04 | 8.71757E-04 | 8.71757E-04 | 8.71408E-04 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.98888E-01 | 1.0 | 1.0 | 9.98888E-01 |
| WW | Friedman Aligned | 1.21443E-05 | 1.21444E-05 | 1.21444E-05 | 1.21443E-05 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.99965E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 8.38840E-03 | 2.13627E-02 | 2.13627E-02 | 2.11564E-02 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S136** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 9.12281E-01 | 1.0 | 1.0 | 9.99780E-01 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S137.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (STLBO is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 8.87311E-04 | 1.45708E-03 | 1.45708E-03 | 1.45612E-03 |
| PSO | Friedman Aligned | 1.30579E-10 | 4.01781E-10 | 4.01781E-10 | 4.01781E-10 |
| PSO | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.53136E-01 |
| CWOA | Friedman | 8.87311E-04 | 1.42576E-03 | 1.42576E-03 | 1.42483E-03 |
| CWOA | Friedman Aligned | <1E-13 | <1E-13 | <1E-13 | <1E-13 |
| CWOA | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.71605E-01 |
| WW | Friedman | 8.87311E-04 | 8.87675E-04 | 8.87675E-04 | 8.87311E-04 |
| WW | Friedman Aligned | 1.11147E-09 | 4.18940E-09 | 4.18940E-09 | 4.18940E-09 |
| WW | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.30369E-01 |
| GOTLBO | Friedman | 4.35052E-03 | 1.45102E-02 | 1.45102E-02 | 1.44170E-02 |
| GOTLBO | Friedman Aligned | 1.44695E-11 | 3.67302E-11 | 3.67302E-11 | 3.67302E-11 |
| GOTLBO | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| NNA | Friedman | 4.35052E-03 | 1.34064E-02 | 1.34064E-02 | 1.33258E-02 |
| NNA | Friedman Aligned | 3.90710E-09 | 1.44262E-08 | 1.44262E-08 | 1.44262E-08 |
| NNA | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| ISCA | Friedman | 5.96940E-03 | 2.20764E-02 | 2.20764E-02 | 2.18643E-02 |
| ISCA | Friedman Aligned | 4.50262E-09 | 1.55860E-08 | 1.55860E-08 | 1.55860E-08 |
| ISCA | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| MABC | Friedman | 2.57340E-02 | 9.75806E-02 | 8.36406E-02 | 9.35933E-02 |
| MABC | Friedman Aligned | 5.23914E-13 | 9.67226E-13 | 9.67226E-13 | 9.67226E-13 |
| MABC | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| IJAYA | Friedman | 2.57340E-02 | 9.75806E-02 | 8.36406E-02 | 9.35933E-02 |
| IJAYA | Friedman Aligned | 2.18045E-10 | 7.54772E-10 | 7.54772E-10 | 7.54772E-10 |
| IJAYA | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| **Table S137** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 6.85289E-02 | 2.39794E-01 | 2.39794E-01 | 2.17870E-01 |
| DE | Friedman Aligned | 7.42368E-10 | 2.74105E-09 | 2.74105E-09 | 2.74105E-09 |
| DE | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| NDE | Friedman | 1.71181E-01 | 5.37924E-01 | 5.37924E-01 | 4.38814E-01 |
| NDE | Friedman Aligned | 1.22573E-02 | 3.77682E-02 | 2.72258E-02 | 3.72367E-02 |
| NDE | Quade | 9.30369E-01 | 1.0 | 1.0 | 9.83227E-01 |
| TLBO | Friedman | 9.89408E-01 | 1.0 | 1.0 | 9.99990E-01 |
| TLBO | Friedman Aligned | 1.52045E-02 | 3.86414E-02 | 2.72258E-02 | 3.81458E-02 |
| TLBO | Quade | 9.44870E-01 | 1.0 | 1.0 | 9.99362E-01 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 8.12763E-01 | 8.12763E-01 | 8.12763E-01 | 8.12763E-01 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.52045E-02 | 3.86414E-02 | 2.72258E-02 | 3.81458E-02 |
| ADELI | Quade | 9.44870E-01 | 1.0 | 1.0 | 9.99362E-01 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S138.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (PSO is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S138** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 8.54143E-01 | 1.0 | 1.0 | 9.92455E-01 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 3.93493E-01 | 8.88533E-01 | 8.88533E-01 | 6.02734E-01 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 8.06951E-02 | 8.38658E-02 | 8.38658E-02 | 8.06951E-02 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S139.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (IJAYA is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 8.30603E-01 | 1.0 | 1.0 | 8.84463E-01 |
| PSO | Friedman Aligned | 2.55584E-02 | 7.93472E-02 | 7.93472E-02 | 7.65731E-02 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 8.30603E-01 | 1.0 | 1.0 | 8.84463E-01 |
| CWOA | Friedman Aligned | 5.81546E-05 | 1.07365E-04 | 1.07365E-04 | 1.07360E-04 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 8.30603E-01 | 1.0 | 1.0 | 8.30603E-01 |
| WW | Friedman Aligned | 9.75209E-07 | 9.75209E-07 | 9.75209E-07 | 9.75209E-07 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 8.60298E-01 | 1.0 | 1.0 | 9.97657E-01 |
| GOTLBO | Friedman Aligned | 8.87840E-01 | 1.0 | 1.0 | 9.99690E-01 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 8.60298E-01 | 1.0 | 1.0 | 9.99247E-01 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 8.60298E-01 | 1.0 | 1.0 | 9.97657E-01 |
| NNA | Friedman Aligned | 1.53028E-03 | 3.88684E-03 | 3.88684E-03 | 3.87999E-03 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S139** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 6.38258E-01 | 1.0 | 1.0 | 9.70394E-01 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S140.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (ISCA is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.93692E-01 | 1.0 | 1.0 | 9.97469E-01 |
| PSO | Friedman Aligned | 4.05630E-03 | 1.24985E-02 | 1.24985E-02 | 1.24284E-02 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.93692E-01 | 1.0 | 1.0 | 9.97469E-01 |
| CWOA | Friedman Aligned | 3.47277E-06 | 6.41127E-06 | 6.41127E-06 | 6.41126E-06 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.93692E-01 | 1.0 | 1.0 | 9.93692E-01 |
| WW | Friedman Aligned | 3.59568E-08 | 3.59568E-08 | 3.59568E-08 | 3.59568E-08 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 9.96887E-01 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 5.31817E-01 | 1.0 | 1.0 | 9.39316E-01 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 9.96887E-01 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.47184E-04 | 3.73641E-04 | 3.73641E-04 | 3.73578E-04 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 8.75367E-01 | 1.0 | 1.0 | 9.99542E-01 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S140** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 2.80474E-01 | 1.0 | 1.0 | 6.79991E-01 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 7.88732E-01 | 1.0 | 1.0 | 9.97148E-01 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S141.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (NNA is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 9.99446E-01 | 1.0 | 1.0 | 9.99855E-01 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 9.99446E-01 | 1.0 | 1.0 | 9.99855E-01 |
| CWOA | Friedman Aligned | 9.57624E-01 | 1.0 | 1.0 | 9.97079E-01 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 9.99446E-01 | 1.0 | 1.0 | 9.99446E-01 |
| WW | Friedman Aligned | 6.15608E-01 | 9.21781E-01 | 9.21781E-01 | 6.15608E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S141** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S142.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (CWOA is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S142** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| WW | Friedman Aligned | 9.96187E-01 | 1.0 | 1.0 | 9.96187E-01 |
| WW | Quade | 1.0 | 1.0 | 1.0 | 1.0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S143.** Adjusted *p*-values for multiple comparisons 1×*N* tests in single-IV case (WW is the control algorithm, Comp parameter). | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| DE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| DE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| EBLSHADE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ADELI | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NDE | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| MABC | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| TLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| GOTLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| STLBO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| **Table S143** (*continued*) | | | | | |
| Algorithm | Test | post-hoc procedure | | | |
| Finner | Holm | Hochberg | Holland |
| PSO | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| PSO | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| IJAYA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| ISCA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| NNA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Friedman Aligned | 1.0 | 1.0 | 1.0 | 1.0 |
| CWOA | Quade | 1.0 | 1.0 | 1.0 | 1.0 |