# Appendixes

Appendix . Information of instances

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | *F* | *Mf* | Small. | *n×F×M×T* | Middle. | *n×F×M×T* | Large | *n×F×M×T* |
| C01-C04 | 2 | 2 3 | C01 | 20 x 2 x 5 x 5 | C17 | 60 x 2 x 7 x 5 | C37 | 120 x 2 x 9 x 5 |
| C05-C08 | 3 | 2 3 3 | C02 | 30 x 2 x 5 x 5 | C18 | 70 x 2 x 7 x 5 | C38 | 140 x 2 x 9 x 5 |
| C09-C12 | 4 | 2 3 3 2 | C03 | 40 x 2 x 5 x 5 | C19 | 80 x 2 x 7 x 5 | C39 | 160 x 2 x 9 x 5 |
| C13-C16 | 5 | 2 3 3 3 2 | C04 | 50 x 2 x 5 x 5 | C20 | 90 x 2 x 7 x 5 | C40 | 180 x 2 x 9 x 5 |
| C17-C21 | 2 | 3 4 | C05 | 20 x 3 x 8 x 5 | C21 | 100 x 2 x 7 x 5 | C41 | 200 x 2 x 9 x 5 |
| C22-C26 | 3 | 3 4 4 | C06 | 30 x 3 x 8 x 5 | C22 | 60 x 3 x 11 x 5 | C42 | 120 x 3 x 15 x 5 |
| C27-C31 | 4 | 3 4 4 2 | C07 | 40 x 3 x 8 x 5 | C23 | 70 x 3 x 11 x 5 | C43 | 140 x 3 x 15 x 5 |
| C32-C36 | 5 | 3 4 4 2 5 | C08 | 50 x 3 x 8 x 5 | C24 | 80 x 3 x 11 x 5 | C44 | 160 x 3 x 15 x 5 |
| C37-C41 | 2 | 4 5 | C09 | 20 x 4 x 10 x 5 | C25 | 90 x 3 x 11 x 5 | C45 | 180 x 3 x 15 x 5 |
| C42-C46 | 3 | 4 5 6 | C10 | 30 x 4 x 10 x 5 | C26 | 100 x 3 x 11 x 5 | C46 | 200 x 3 x 15 x 5 |
| C47-C51 | 4 | 4 5 6 3 | C11 | 40 x 4 x 10 x 5 | C27 | 60 x 4 x 13 x 5 | C47 | 120 x 4 x 18 x 5 |
| C52-C56 | 5 | 4 5 6 3 7 | C12 | 50 x 4 x 10 x 5 | C28 | 70 x 4 x 13 x 5 | C48 | 140 x 4 x 18 x 5 |
|  |  |  | C13 | 20 x 5 x 13 x 5 | C29 | 80 x 4 x 13 x 5 | C49 | 160 x 4 x 18 x 5 |
|  |  |  | C14 | 30 x 5 x 13 x 5 | C30 | 90 x 4 x 13 x 5 | C50 | 180 x 4 x 18 x 5 |
|  |  |  | C15 | 40 x 5 x 13 x 5 | C31 | 100 x 4 x 13 x 5 | C51 | 200 x 4 x 18 x 5 |
|  |  |  | C16 | 50 x 5 x 13 x 5 | C32 | 60 x 5 x 18 x 5 | C52 | 120 x 5 x 25 x 5 |
|  |  |  |  |  | C33 | 70 x 5 x 18 x 5 | C53 | 140 x 5 x 25 x 5 |
|  |  |  |  |  | C34 | 80 x 5 x 18 x 5 | C54 | 160 x 5 x 25 x 5 |
|  |  |  |  |  | C35 | 90 x 5 x 18 x 5 | C55 | 180 x 5 x 25 x 5 |
|  |  |  |  |  | C36 | 100 x 5 x 18 x 5 | C56 | 200 x 5 x 25 x 5 |

Appendix . Metrics C and IGD comparisons of EMSEA with EMSEA-WIM

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | EMSEA(A) vs EMSEA-WIM(B) | | | | Ins. | EMSEA(A) vs EMSEA-WIM(B) | | | |
|  | C(A,B) | C(B,A) | IGD(A) | IGD(B) |  | C(A,B) | C(B,A) | IGD(A) | IGD(B) |
| C1 | **1.0000** | 0.0000 | **0.0000** | 0.1498 | C29 | **1.0000** | 0.0000 | **0.0000** | 0.8060 |
| C2 | **1.0000** | 0.0000 | **0.0000** | 0.5956 | C30 | **1.0000** | 0.0000 | **0.0000** | 0.8626 |
| C3 | **1.0000** | 0.0000 | **0.0000** | 0.8935 | C31 | **1.0000** | 0.0000 | **0.0000** | 0.8022 |
| C4 | **1.0000** | 0.0000 | **0.0000** | 0.8709 | C32 | **1.0000** | 0.0000 | **0.0000** | 0.3962 |
| C5 | **1.0000** | 0.0000 | **0.0000** | 0.4718 | C33 | **1.0000** | 0.0000 | **0.0000** | 0.6872 |
| C6 | **1.0000** | 0.0000 | **0.0000** | 0.3880 | C34 | **1.0000** | 0.0000 | **0.0000** | 0.6304 |
| C7 | **1.0000** | 0.0000 | **0.0000** | 0.4056 | C35 | **1.0000** | 0.0000 | **0.0000** | 0.5578 |
| C8 | **1.0000** | 0.0000 | **0.0000** | 0.7445 | C36 | **1.0000** | 0.0000 | **0.0000** | 0.7430 |
| C9 | **1.0000** | 0.0000 | **0.0000** | 0.3190 | C37 | **1.0000** | 0.0000 | **0.0000** | 0.9302 |
| C10 | **1.0000** | 0.0000 | **0.0000** | 0.4268 | C38 | **1.0000** | 0.0000 | **0.0000** | 1.0097 |
| C11 | **1.0000** | 0.0000 | **0.0000** | 0.4761 | C39 | **1.0000** | 0.0000 | **0.0000** | 1.0698 |
| C12 | **1.0000** | 0.0000 | **0.0000** | 0.4781 | C40 | **1.0000** | 0.0000 | **0.0000** | 1.0435 |
| C13 | **1.0000** | 0.0000 | **0.0000** | 0.2936 | C41 | **1.0000** | 0.0000 | **0.0000** | 1.0957 |
| C14 | **1.0000** | 0.0000 | **0.0000** | 0.3144 | C42 | **1.0000** | 0.0000 | **0.0000** | 0.9914 |
| C15 | **1.0000** | 0.0000 | **0.0000** | 0.5696 | C43 | **1.0000** | 0.0000 | **0.0000** | 0.8590 |
| C16 | **1.0000** | 0.0000 | **0.0000** | 0.6840 | C44 | **1.0000** | 0.0000 | **0.0000** | 0.8597 |
| C17 | **1.0000** | 0.0000 | **0.0000** | 0.7384 | C45 | **1.0000** | 0.0000 | **0.0000** | 0.9730 |
| C18 | **1.0000** | 0.0000 | **0.0000** | 0.8745 | C46 | **1.0000** | 0.0000 | **0.0000** | 0.9465 |
| C19 | **1.0000** | 0.0000 | **0.0000** | 0.9652 | C47 | **1.0000** | 0.0000 | **0.0000** | 0.8890 |
| C20 | **1.0000** | 0.0000 | **0.0000** | 0.8081 | C48 | **1.0000** | 0.0000 | **0.0000** | 0.8183 |
| C21 | **1.0000** | 0.0000 | **0.0000** | 0.7874 | C49 | **1.0000** | 0.0000 | **0.0000** | 0.9570 |
| C22 | **1.0000** | 0.0000 | **0.0000** | 0.4846 | C50 | **1.0000** | 0.0000 | **0.0000** | 0.9127 |
| C23 | **1.0000** | 0.0000 | **0.0000** | 0.6782 | C51 | **1.0000** | 0.0000 | **0.0000** | 0.9120 |
| C24 | **1.0000** | 0.0000 | **0.0000** | 0.7759 | C52 | **1.0000** | 0.0000 | **0.0000** | 0.8605 |
| C25 | **1.0000** | 0.0000 | **0.0000** | 0.5328 | C53 | **1.0000** | 0.0000 | **0.0000** | 0.8378 |
| C26 | **1.0000** | 0.0000 | **0.0000** | 0.9097 | C54 | **1.0000** | 0.0000 | **0.0000** | 0.7199 |
| C27 | **1.0000** | 0.0000 | **0.0000** | 0.6830 | C55 | **1.0000** | 0.0000 | **0.0000** | 0.8734 |
| C28 | **1.0000** | 0.0000 | **0.0000** | 0.6983 | C56 | **1.0000** | 0.0000 | **0.0000** | 0.8730 |

Appendix 3. Metrics C and IGD comparisons of EMSEA with EMSEA-WLS

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | EMSEA(A) vs EMSEA-WLS(B) | | | | Ins. | EMSEA(A) vs EMSEA-WLS(B) | | | |
|  | C(A,B) | C(B,A) | IGD(A) | IGD(B) |  | C(A,B) | C(B,A) | IGD(A) | IGD(B) |
| C1 | **0.8571** | 0.4444 | **0.0279** | 0.0797 | C29 | **0.8889** | 0.1250 | **0.0111** | 0.1482 |
| C2 | **0.8000** | 0.0455 | **0.0074** | 0.0702 | C30 | **0.9796** | 0.0000 | **0.0032** | 0.1743 |
| C3 | **0.8667** | 0.3529 | **0.0092** | 0.1490 | C31 | **0.8615** | 0.1111 | **0.0028** | 0.0790 |
| C4 | **0.6400** | 0.3571 | **0.0345** | 0.1094 | C32 | **0.8429** | 0.0952 | **0.0079** | 0.0508 |
| C5 | **0.7895** | 0.2000 | **0.0281** | 0.0884 | C33 | **0.7736** | 0.3030 | **0.0184** | 0.0999 |
| C6 | **0.8276** | 0.1250 | **0.0107** | 0.0665 | C34 | **0.8667** | 0.0909 | **0.0194** | 0.0700 |
| C7 | **0.8444** | 0.0606 | **0.0125** | 0.0523 | C35 | **0.7792** | 0.2500 | **0.0104** | 0.0531 |
| C8 | **0.9231** | 0.0000 | **0.0040** | 0.0722 | C36 | **0.9846** | 0.0000 | **0.0002** | 0.1535 |
| C9 | **0.9286** | 0.0000 | **0.0004** | 0.0689 | C37 | **0.9792** | 0.1250 | **0.0007** | 0.1363 |
| C10 | **0.6111** | 0.1563 | **0.0121** | 0.0643 | C38 | **0.9444** | 0.0000 | **0.0112** | 0.1716 |
| C11 | **0.7885** | 0.0938 | **0.0240** | 0.0492 | C39 | **0.8400** | 0.1429 | **0.0130** | 0.1076 |
| C12 | **0.9000** | 0.0000 | **0.0034** | 0.0708 | C40 | **0.9535** | 0.0000 | **0.0014** | 0.0503 |
| C13 | **0.5714** | 0.3077 | **0.0207** | 0.0367 | C41 | **0.9167** | 0.0000 | **0.0026** | 0.1148 |
| C14 | **0.8750** | 0.1471 | **0.0051** | 0.0470 | C42 | **0.8958** | 0.1429 | **0.0094** | 0.1572 |
| C15 | **0.7045** | 0.4138 | **0.0091** | 0.0444 | C43 | **0.8923** | 0.3824 | **0.0088** | 0.0683 |
| C16 | **0.7674** | 0.1667 | **0.0060** | 0.0852 | C44 | **0.7966** | 0.1429 | **0.0237** | 0.1296 |
| C17 | **0.9032** | 0.1600 | **0.0066** | 0.1654 | C45 | **0.8298** | 0.3182 | **0.0186** | 0.1638 |
| C18 | **0.8889** | 0.2174 | **0.0072** | 0.1564 | C46 | **0.9623** | 0.0000 | **0.0189** | 0.1362 |
| C19 | **0.8000** | 0.0526 | **0.0090** | 0.0714 | C47 | **0.9434** | 0.2188 | **0.0103** | 0.1756 |
| C20 | **0.8108** | 0.1176 | **0.0159** | 0.0859 | C48 | **0.8625** | 0.0625 | **0.0298** | 0.0478 |
| C21 | **0.8431** | 0.1923 | **0.0456** | 0.0655 | C49 | **0.9722** | 0.0313 | **0.0039** | 0.1300 |
| C22 | **0.8806** | 0.1707 | **0.0057** | 0.0440 | C50 | **0.8929** | 0.1081 | **0.0051** | 0.1110 |
| C23 | **0.9032** | 0.1818 | **0.0110** | 0.0727 | C51 | **1.0000** | 0.0000 | **0.0000** | 0.1782 |
| C24 | **0.9821** | 0.0000 | **0.0016** | 0.1456 | C52 | **1.0000** | 0.0000 | **0.0000** | 0.1898 |
| C25 | **0.8289** | 0.0714 | **0.0052** | 0.0500 | C53 | **0.9344** | 0.0333 | **0.0095** | 0.1428 |
| C26 | **0.9091** | 0.0500 | **0.0172** | 0.0965 | C54 | **0.9368** | 0.0741 | **0.0050** | 0.0604 |
| C27 | **0.8431** | 0.2581 | **0.0079** | 0.1229 | C55 | **0.8667** | 0.2353 | **0.0041** | 0.0776 |
| C28 | **0.8036** | 0.2051 | **0.0054** | 0.0612 | C56 | **0.9697** | 0.0513 | **0.0009** | 0.0992 |

Appendix 4. Metrics C and IGD comparisons of EMSEA with EA-BTS

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | EMSEA(A) vs EA-BTS(B) | | | | Ins. | EMSEA(A) vs EA-BTS(B) | | | |
|  | C(A,B) | C(B,A) | IGD(A) | IGD(B) |  | C(A,B) | C(B,A) | IGD(A) | IGD(B) |
| C1 | **0.9524** | 0.4444 | **0.0193** | 0.0593 | C29 | 0.3333 | **0.6667** | 0.0440 | **0.0183** |
| C2 | 0.0667 | **0.7273** | **0.0344** | 0.0780 | C30 | **0.5882** | 0.3913 | 0.0190 | **0.0178** |
| C3 | **0.8462** | 0.1176 | **0.0083** | 0.0922 | C31 | 0.4118 | **0.5926** | 0.0316 | **0.0144** |
| C4 | **0.8000** | 0.0000 | **0.0088** | 0.0426 | C32 | **0.7073** | 0.2143 | **0.0110** | 0.0302 |
| C5 | **0.7500** | 0.3000 | **0.0123** | 0.0539 | C33 | 0.3333 | **0.6364** | 0.0332 | **0.0165** |
| C6 | **0.6842** | 0.0833 | **0.0041** | 0.0407 | C34 | **0.6750** | 0.3864 | **0.0058** | 0.0199 |
| C7 | **0.6400** | 0.3333 | **0.0067** | 0.0368 | C35 | 0.3617 | **0.7045** | 0.0226 | **0.0200** |
| C8 | **0.5000** | 0.1176 | **0.0192** | 0.0535 | C36 | **0.5946** | 0.2368 | **0.0171** | 0.0195 |
| C9 | **0.7647** | 0.1875 | **0.0138** | 0.0493 | C37 | **0.5714** | 0.3333 | **0.0078** | 0.0235 |
| C10 | **0.6071** | 0.3125 | **0.0115** | 0.0338 | C38 | **0.4375** | 0.3500 | **0.0241** | 0.0322 |
| C11 | **0.6154** | 0.4063 | 0.0347 | **0.0280** | C39 | **0.5556** | 0.1905 | **0.0112** | 0.0295 |
| C12 | **0.5161** | 0.3030 | **0.0178** | 0.0231 | C40 | **0.5556** | 0.5385 | **0.0146** | 0.0380 |
| C13 | **0.5758** | 0.3462 | **0.0177** | 0.0199 | C41 | **0.5714** | 0.3333 | **0.0106** | 0.0265 |
| C14 | **0.6563** | 0.4412 | **0.0115** | 0.0385 | C42 | **0.6429** | 0.1429 | **0.0226** | 0.0308 |
| C15 | 0.4000 | **0.5517** | 0.0175 | **0.0159** | C43 | 0.1786 | **0.5882** | 0.0232 | **0.0137** |
| C16 | **0.5714** | 0.3611 | **0.0094** | 0.0328 | C44 | 0.4390 | **0.6000** | 0.0224 | **0.0116** |
| C17 | 0.2941 | **0.5600** | 0.0467 | **0.0304** | C45 | **0.5833** | 0.2727 | 0.0382 | **0.0260** |
| C18 | **0.6154** | 0.2609 | **0.0208** | 0.0323 | C46 | 0.2759 | **0.4615** | 0.0205 | **0.0138** |
| C19 | **0.8500** | 0.0526 | **0.0238** | 0.0383 | C47 | 0.3548 | **0.3750** | 0.0189 | **0.0186** |
| C20 | 0.2000 | **0.2353** | **0.0239** | 0.0492 | C48 | 0.2973 | **0.4688** | 0.0223 | **0.0167** |
| C21 | **0.5926** | 0.3846 | **0.0234** | 0.0254 | C49 | 0.5714 | **0.5938** | 0.0287 | **0.0225** |
| C22 | **0.6286** | 0.3415 | **0.0102** | 0.0344 | C50 | 0.1212 | **0.3784** | 0.0206 | **0.0147** |
| C23 | **0.6744** | 0.3333 | **0.0081** | 0.0218 | C51 | 0.4286 | **0.5000** | **0.0155** | 0.0213 |
| C24 | **0.7667** | 0.2400 | **0.0194** | 0.0435 | C52 | **0.8611** | 0.1000 | **0.0043** | 0.0465 |
| C25 | **0.6286** | 0.3333 | **0.0094** | 0.0251 | C53 | 0.3226 | **0.4667** | **0.0190** | 0.0276 |
| C26 | **0.5806** | 0.3000 | **0.0193** | 0.0237 | C54 | **0.5526** | 0.4444 | **0.0078** | 0.0141 |
| C27 | **0.7188** | 0.3548 | **0.0111** | 0.0292 | C55 | 0.1622 | **0.5882** | 0.0227 | **0.0108** |
| C28 | **0.6667** | 0.4359 | **0.0092** | 0.0315 | C56 | 0.2308 | **0.5897** | **0.0142** | 0.0156 |

Appendix 5. Metric C comparisons of EMSEA with SPEA2, NNIA, KMOEA-D and NSGA-II

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | EMSEA(A) vs SPEA2(B) | | EMSEA(A) vs NNIA(C) | | EMSEA(A) vs KMOEA-D(D) | | EMSEA(A) vs NSGA-II(E) | |
|  | C(A,B) | C(B,A) | C(A,C) | C(C,A) | C(A,D) | C(D,A) | C(A,E) | C(E,A) |
| C01 | **0.8462** | 0.1111 | **0.6452** | 0.3889 | **0.7500** | 0.2222 | **0.7727** | 0.2778 |
| C02 | **0.8500** | 0.0455 | **0.6667** | 0.4091 | **0.8571** | 0.2273 | **0.7037** | 0.1818 |
| C03 | **0.8824** | 0.1765 | **0.7097** | 0.1765 | **0.7500** | 0.3529 | **0.7407** | 0.2353 |
| C04 | **0.6429** | 0.2857 | **0.7931** | 0.1429 | **0.9091** | 0.0714 | **0.5455** | 0.2857 |
| C05 | **0.9375** | 0.0000 | **0.7600** | 0.0000 | **1.0000** | 0.0000 | **0.8148** | 0.1000 |
| C06 | **0.7333** | 0.1667 | **0.6286** | 0.5000 | **0.9474** | 0.0000 | **0.8298** | 0.2500 |
| C07 | **0.9118** | 0.2121 | **0.6735** | 0.2121 | **0.8571** | 0.1818 | **0.7179** | 0.2121 |
| C08 | **0.9444** | 0.0000 | **0.8750** | 0.0588 | **0.8824** | 0.0000 | **0.8780** | 0.0000 |
| C09 | **0.9762** | 0.0000 | **0.9512** | 0.0000 | **1.0000** | 0.0000 | **0.8788** | 0.0625 |
| C10 | **0.8148** | 0.0000 | **0.6923** | 0.2188 | **0.9200** | 0.0625 | **0.8000** | 0.0625 |
| C11 | **0.8000** | 0.1563 | **0.7857** | 0.0313 | **0.8571** | 0.0000 | **0.7714** | 0.2188 |
| C12 | **0.7826** | 0.2121 | **0.6364** | 0.3333 | **0.8125** | 0.0909 | **0.6000** | 0.3333 |
| C13 | **0.5789** | 0.3462 | **0.7750** | 0.2692 | **0.5238** | 0.3077 | **0.6774** | 0.4231 |
| C14 | **0.9268** | 0.0588 | **0.7193** | 0.2647 | **0.9714** | 0.0000 | **0.8125** | 0.4118 |
| C15 | **0.7826** | 0.4483 | **0.7400** | 0.1724 | **0.8421** | 0.2069 | **0.7174** | 0.2414 |
| C16 | **0.8511** | 0.2500 | **0.7308** | 0.1944 | **0.8095** | 0.0833 | **0.6842** | 0.3333 |
| C17 | **0.9697** | 0.0400 | **0.7632** | 0.2800 | **0.8000** | 0.0000 | **0.9032** | 0.0800 |
| C18 | **0.6471** | 0.2174 | **0.6977** | 0.2609 | 0.2000 | **0.3043** | **0.6222** | 0.4348 |
| C19 | **0.9231** | 0.0526 | **0.9310** | 0.0000 | **1.0000** | 0.0000 | **0.6000** | 0.2105 |
| C20 | **0.8276** | 0.1176 | **0.7742** | 0.3529 | **0.6667** | 0.0000 | **0.8696** | 0.0000 |
| C21 | **0.7250** | 0.1923 | **0.8909** | 0.2308 | **0.8750** | 0.0385 | **0.7778** | 0.3462 |
| C22 | **0.7297** | 0.4146 | **0.5660** | 0.4878 | **0.9032** | 0.1463 | 0.4839 | **0.4878** |
| C23 | **0.8421** | 0.2121 | **0.5455** | 0.3333 | **0.7143** | 0.3030 | **0.6957** | 0.3333 |
| C24 | **1.0000** | 0.0000 | **0.8800** | 0.2800 | **0.7273** | 0.1600 | **0.7857** | 0.1200 |
| C25 | **0.7727** | 0.2619 | **0.6071** | 0.3333 | **0.7895** | 0.0714 | **0.7027** | 0.3095 |
| C26 | **0.8710** | 0.1500 | **0.6286** | 0.4000 | **0.1667** | 0.1500 | **0.9091** | 0.2500 |
| C27 | **0.9792** | 0.0000 | **0.8000** | 0.1613 | **0.7857** | 0.0968 | **0.8409** | 0.2903 |
| C28 | **0.7917** | 0.2308 | **0.8431** | 0.2308 | **0.9412** | 0.0000 | **0.8281** | 0.2308 |
| C29 | **0.9444** | 0.0000 | **0.9000** | 0.1250 | **0.6250** | 0.0417 | **0.9070** | 0.0833 |
| C30 | **0.8235** | 0.0000 | **0.6000** | 0.1739 | **0.9444** | 0.0000 | **0.8868** | 0.0435 |
| C31 | **0.9286** | 0.0370 | **0.8542** | 0.3333 | **1.0000** | 0.0000 | **0.7925** | 0.2222 |
| C32 | **0.7895** | 0.0952 | **0.6806** | 0.1905 | **0.9394** | 0.0000 | **0.7042** | 0.1667 |
| C33 | **0.9796** | 0.0000 | **0.7358** | 0.2727 | **0.9583** | 0.1515 | **0.8148** | 0.1818 |
| C34 | **0.9298** | 0.0227 | **0.8846** | 0.1136 | **0.9655** | 0.0455 | **0.9200** | 0.0455 |
| C35 | **0.7551** | 0.1591 | **0.6056** | 0.3182 | **0.7391** | 0.0909 | **0.7609** | 0.3182 |
| C36 | **0.9556** | 0.0000 | **0.8514** | 0.0263 | **0.8750** | 0.0263 | **0.8846** | 0.0263 |
| C37 | **0.8800** | 0.1250 | **0.6889** | 0.3750 | **0.8000** | 0.1667 | **0.8049** | 0.2500 |
| C38 | **0.9310** | 0.0000 | **0.8889** | 0.2000 | **0.8000** | 0.0000 | **0.8636** | 0.0500 |
| C39 | **0.9231** | 0.1429 | **0.7619** | 0.4286 | **0.5000** | 0.1429 | **0.7241** | 0.0476 |
| C40 | **0.9091** | 0.0000 | **0.8448** | 0.0385 | **0.8000** | 0.0385 | **0.7955** | 0.0000 |
| C41 | **0.7895** | 0.2500 | **0.6207** | 0.3333 | 0.1667 | **0.2500** | **0.8462** | 0.2083 |
| C42 | **0.9211** | 0.0714 | **0.9107** | 0.0357 | **0.8571** | 0.0357 | **0.9200** | 0.0000 |
| C43 | **0.7660** | 0.3824 | **0.6795** | 0.3824 | **0.5000** | 0.2059 | **0.7647** | 0.2941 |
| C44 | **0.8718** | 0.0571 | **0.8421** | 0.0571 | **0.5000** | 0.0286 | **0.7358** | 0.1714 |
| C45 | **1.0000** | 0.0000 | **0.9167** | 0.0000 | **0.3333** | 0.3182 | **0.9722** | 0.0000 |
| C46 | **0.8718** | 0.0385 | **0.9167** | 0.0385 | **0.8750** | 0.0000 | **0.9524** | 0.0769 |
| C47 | **0.9677** | 0.0000 | **0.8947** | 0.0313 | **0.9231** | 0.0000 | **0.8235** | 0.1250 |
| C48 | **0.9400** | 0.1250 | **0.8095** | 0.2188 | **0.8889** | 0.0313 | **0.7846** | 0.2500 |
| C49 | **0.9643** | 0.0938 | **0.8462** | 0.1563 | **0.7500** | 0.1250 | **0.9714** | 0.0000 |
| C50 | **0.9016** | 0.0811 | **0.7419** | 0.3243 | **0.5882** | 0.1081 | **0.8514** | 0.0541 |
| C51 | **0.9302** | 0.0313 | **0.9028** | 0.1563 | **0.7778** | 0.0000 | **0.8267** | 0.0938 |
| C52 | **0.9444** | 0.0333 | **0.8261** | 0.0667 | **0.9615** | 0.0000 | **0.9800** | 0.0000 |
| C53 | **1.0000** | 0.0000 | **0.9643** | 0.0333 | **0.9375** | 0.0000 | **0.8448** | 0.0667 |
| C54 | **0.8333** | 0.2593 | **0.7429** | 0.2037 | **0.9737** | 0.0185 | **0.7471** | 0.2778 |
| C55 | **0.8000** | 0.1569 | **0.7822** | 0.2745 | **0.8400** | 0.1961 | **0.7794** | 0.2941 |
| C56 | **0.8600** | 0.1282 | **0.8902** | 0.1282 | **0.8696** | 0.0513 | **0.7216** | 0.1282 |

Appendix 6. Metrics IGD and Rnd comparisons of EMSEA with SPEA2, NNIA, KMOEA-D and NSGA-II

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | IGD | | | | | Rnd | | | | |
|  | EMSEA | SPEA2 | NNIA | KMOEA-D | NSGA-II | EMSEA | SPEA2 | NNIA | KMOEA-D | NSGA-II |
| C01 | 0.0511 | 0.0644 | **0.0427** | 0.0812 | 0.0775 | **0.4583** | 0.0000 | 0.3750 | 0.1250 | 0.0833 |
| C02 | **0.0193** | 0.0678 | 0.0495 | 0.2004 | 0.0707 | **0.6190** | 0.0000 | 0.3333 | 0.0476 | 0.0000 |
| C03 | **0.0456** | 0.1138 | 0.0540 | 0.1212 | 0.1303 | **0.4667** | 0.0000 | 0.2667 | 0.0667 | 0.2000 |
| C04 | 0.1082 | 0.1547 | 0.0646 | 0.1622 | **0.0429** | 0.4286 | 0.0952 | 0.0000 | 0.0000 | **0.4762** |
| C05 | **0.0385** | 0.1250 | 0.0691 | 0.1806 | 0.0702 | **0.6429** | 0.0714 | 0.0714 | 0.0000 | 0.2143 |
| C06 | **0.0265** | 0.0901 | 0.0493 | 0.1248 | 0.0843 | 0.4444 | 0.0370 | **0.4815** | 0.0000 | 0.0370 |
| C07 | **0.0311** | 0.0534 | 0.0475 | 0.1485 | 0.0525 | **0.4468** | 0.0426 | 0.2340 | 0.0638 | 0.2128 |
| C08 | **0.0132** | 0.1195 | 0.1001 | 0.1927 | 0.0943 | **0.6400** | 0.0400 | 0.1200 | 0.0000 | 0.2000 |
| C09 | **0.0092** | 0.0870 | 0.0792 | 0.0946 | 0.0599 | **0.8571** | 0.0286 | 0.0286 | 0.0000 | 0.0857 |
| C10 | **0.0083** | 0.0720 | 0.0679 | 0.1309 | 0.0823 | **0.7143** | 0.0286 | 0.2286 | 0.0286 | 0.0000 |
| C11 | **0.0383** | 0.0571 | 0.0570 | 0.1196 | 0.0752 | **0.5682** | 0.1591 | 0.1591 | 0.0000 | 0.1136 |
| C12 | **0.0271** | 0.0769 | 0.0501 | 0.1790 | 0.0624 | **0.5263** | 0.0526 | 0.2632 | 0.0526 | 0.1053 |
| C13 | **0.0301** | 0.0663 | 0.0696 | 0.0660 | 0.0650 | **0.4839** | 0.0968 | 0.0000 | 0.0968 | 0.3226 |
| C14 | **0.0141** | 0.0632 | 0.0490 | 0.0860 | 0.0554 | **0.4857** | 0.0000 | 0.2857 | 0.0000 | 0.2286 |
| C15 | **0.0234** | 0.0758 | 0.0852 | 0.1085 | 0.0608 | **0.6000** | 0.1200 | 0.0000 | 0.0400 | 0.2400 |
| C16 | **0.0410** | 0.0756 | 0.0619 | 0.1312 | 0.0679 | **0.5526** | 0.0000 | 0.0526 | 0.0789 | 0.3158 |
| C17 | **0.0228** | 0.1206 | 0.0804 | 0.3222 | 0.0946 | **0.6667** | 0.0370 | 0.2963 | 0.0000 | 0.0000 |
| C18 | **0.0260** | 0.0796 | 0.0734 | 0.1783 | 0.0868 | **0.4194** | 0.0323 | 0.1935 | 0.0323 | 0.3226 |
| C19 | **0.0110** | 0.1034 | 0.1065 | 0.1897 | 0.1049 | **0.6000** | 0.0000 | 0.0000 | 0.0000 | 0.4000 |
| C20 | **0.0218** | 0.1011 | 0.0999 | 0.3814 | 0.1099 | **0.5882** | 0.1176 | 0.2941 | 0.0000 | 0.0000 |
| C21 | **0.0392** | 0.0741 | 0.1290 | 0.2088 | 0.0601 | **0.5000** | 0.1765 | 0.0588 | 0.0000 | 0.2647 |
| C22 | **0.0211** | 0.0427 | 0.0390 | 0.1117 | 0.0401 | **0.4186** | 0.1628 | 0.1860 | 0.0000 | 0.2326 |
| C23 | **0.0259** | 0.0793 | 0.0545 | 0.1935 | 0.0480 | **0.5000** | 0.0556 | 0.1667 | 0.0556 | 0.2222 |
| C24 | **0.0095** | 0.0713 | 0.0521 | 0.1769 | 0.0609 | **0.5357** | 0.0000 | 0.1071 | 0.1071 | 0.2500 |
| C25 | **0.0267** | 0.0548 | 0.0425 | 0.1434 | 0.0432 | **0.3966** | 0.0862 | 0.2414 | 0.0345 | 0.2414 |
| C26 | **0.0632** | 0.1245 | 0.0710 | 0.2868 | 0.0955 | **0.4091** | 0.0909 | 0.3182 | 0.0909 | 0.0909 |
| C27 | **0.0117** | 0.0961 | 0.0777 | 0.1894 | 0.0741 | **0.6364** | 0.0000 | 0.0909 | 0.0606 | 0.2121 |
| C28 | **0.0127** | 0.0546 | 0.0645 | 0.1216 | 0.0509 | **0.6136** | 0.0682 | 0.0909 | 0.0227 | 0.2045 |
| C29 | **0.0123** | 0.1402 | 0.1239 | 0.2742 | 0.1274 | **0.7778** | 0.0000 | 0.1481 | 0.0741 | 0.0000 |
| C30 | **0.0721** | 0.1476 | 0.0947 | 0.4016 | 0.1309 | **0.5429** | 0.0000 | 0.4571 | 0.0000 | 0.0000 |
| C31 | **0.0175** | 0.0601 | 0.0482 | 0.1741 | 0.0500 | **0.6296** | 0.0000 | 0.2593 | 0.0000 | 0.1111 |
| C32 | **0.0219** | 0.0420 | 0.0353 | 0.0817 | 0.0307 | **0.5079** | 0.0159 | 0.2381 | 0.0000 | 0.2381 |
| C33 | **0.0304** | 0.0895 | 0.0667 | 0.1797 | 0.0864 | **0.5789** | 0.0000 | 0.3158 | 0.0263 | 0.0789 |
| C34 | **0.0288** | 0.0600 | 0.0715 | 0.1531 | 0.0666 | **0.7358** | 0.0377 | 0.1321 | 0.0189 | 0.0755 |
| C35 | **0.0207** | 0.0631 | 0.0406 | 0.1436 | 0.0465 | **0.4912** | 0.0351 | 0.3684 | 0.0351 | 0.0702 |
| C36 | **0.0195** | 0.0643 | 0.0652 | 0.1857 | 0.0702 | **0.7708** | 0.0417 | 0.0625 | 0.0417 | 0.0833 |
| C37 | **0.0241** | 0.1177 | 0.1018 | 0.3592 | 0.0956 | **0.5000** | 0.0000 | 0.3333 | 0.0000 | 0.1667 |
| C38 | **0.0526** | 0.1251 | 0.1307 | 0.4988 | 0.0934 | **0.7619** | 0.0952 | 0.0476 | 0.0476 | 0.0476 |
| C39 | **0.0195** | 0.1413 | 0.1316 | 0.2291 | 0.0936 | **0.5500** | 0.0000 | 0.2000 | 0.1000 | 0.2000 |
| C40 | **0.0164** | 0.0780 | 0.0795 | 0.2577 | 0.0532 | **0.6486** | 0.0541 | 0.0811 | 0.0270 | 0.1892 |
| C41 | **0.0186** | 0.0980 | 0.0796 | 0.3161 | 0.1118 | **0.5000** | 0.0333 | 0.3333 | 0.0000 | 0.1333 |
| C42 | **0.0108** | 0.1313 | 0.1169 | 0.3427 | 0.1385 | **0.7500** | 0.0938 | 0.0313 | 0.0313 | 0.0938 |
| C43 | **0.0230** | 0.0521 | 0.0515 | 0.1529 | 0.0497 | **0.4390** | 0.1707 | 0.0976 | 0.0732 | 0.2195 |
| C44 | **0.0167** | 0.0592 | 0.0551 | 0.2402 | 0.0498 | **0.6591** | 0.0000 | 0.1591 | 0.0227 | 0.1591 |
| C45 | **0.0252** | 0.1510 | 0.1205 | 0.3207 | 0.1409 | **0.7143** | 0.0000 | 0.1429 | 0.0952 | 0.0476 |
| C46 | **0.0320** | 0.1079 | 0.1030 | 0.3428 | 0.1054 | **0.7742** | 0.0645 | 0.0323 | 0.0323 | 0.0968 |
| C47 | **0.0095** | 0.1228 | 0.1124 | 0.3099 | 0.1140 | **0.7568** | 0.0000 | 0.0000 | 0.0000 | 0.2432 |
| C48 | **0.0126** | 0.0548 | 0.0518 | 0.1322 | 0.0521 | **0.5897** | 0.0000 | 0.0513 | 0.0000 | 0.3590 |
| C49 | **0.0197** | 0.1148 | 0.0814 | 0.3063 | 0.1073 | **0.7714** | 0.0000 | 0.1714 | 0.0286 | 0.0286 |
| C50 | **0.0069** | 0.0661 | 0.0501 | 0.1778 | 0.0582 | **0.5952** | 0.0238 | 0.3810 | 0.0000 | 0.0000 |
| C51 | **0.0356** | 0.1252 | 0.0990 | 0.3219 | 0.1005 | **0.5745** | 0.0426 | 0.1489 | 0.0000 | 0.2340 |
| C52 | **0.0098** | 0.1017 | 0.0961 | 0.2152 | 0.0895 | **0.6429** | 0.0714 | 0.2857 | 0.0000 | 0.0000 |
| C53 | **0.0141** | 0.1091 | 0.1164 | 0.2887 | 0.1035 | **0.7568** | 0.0000 | 0.0000 | 0.0000 | 0.2432 |
| C54 | **0.0123** | 0.0671 | 0.0559 | 0.1413 | 0.0483 | **0.6600** | 0.1400 | 0.0400 | 0.0000 | 0.1600 |
| C55 | **0.0079** | 0.0730 | 0.0725 | 0.1771 | 0.0653 | **0.6939** | 0.0816 | 0.0204 | 0.0000 | 0.2041 |
| C56 | **0.0083** | 0.0583 | 0.0663 | 0.1878 | 0.0532 | **0.5283** | 0.1132 | 0.1132 | 0.0189 | 0.2264 |

Appendix 7. Metric HV comparisons of EMSEA with SPEA2, NNIA, KMOEA-D and NSGA-II

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | HV | | | | | Ins. | HV | | | | |
|  | EMSEA | SPEA2 | NNIA | KMOEA-D | NSGA-II |  | EMSEA | SPEA2 | NNIA | KMOEA-D | NSGA-II |
| C01 | **0.8312** | 0.7557 | 0.7854 | 0.6998 | 0.7614 | C29 | **0.8139** | 0.6471 | 0.6759 | 0.4716 | 0.6610 |
| C02 | **0.9102** | 0.8563 | 0.8915 | 0.7761 | 0.8510 | C30 | **0.7488** | 0.6223 | 0.7109 | 0.3522 | 0.6443 |
| C03 | **0.9055** | 0.8093 | 0.8374 | 0.7416 | 0.8243 | C31 | **0.9028** | 0.8422 | 0.8661 | 0.7043 | 0.8570 |
| C04 | **0.8901** | 0.8334 | 0.8095 | 0.7447 | 0.8523 | C32 | **0.7768** | 0.7296 | 0.7328 | 0.6534 | 0.7335 |
| C05 | **0.9059** | 0.8174 | 0.8378 | 0.7033 | 0.8340 | C33 | **0.8709** | 0.7848 | 0.8237 | 0.6874 | 0.7934 |
| C06 | **0.8232** | 0.7459 | 0.8011 | 0.6710 | 0.7591 | C34 | **0.8045** | 0.7151 | 0.7132 | 0.6115 | 0.7248 |
| C07 | **0.7540** | 0.6957 | 0.7155 | 0.6517 | 0.7251 | C35 | **0.7857** | 0.7216 | 0.7450 | 0.6346 | 0.7449 |
| C08 | **0.8439** | 0.7179 | 0.7204 | 0.5961 | 0.7250 | C36 | **0.8878** | 0.8119 | 0.8287 | 0.7388 | 0.8198 |
| C09 | **0.8019** | 0.6814 | 0.6996 | 0.6631 | 0.7237 | C37 | **0.7774** | 0.6164 | 0.6658 | 0.2545 | 0.6373 |
| C10 | **0.8133** | 0.7393 | 0.7587 | 0.6719 | 0.7260 | C38 | **0.8901** | 0.7485 | 0.7756 | 0.5157 | 0.7837 |
| C11 | **0.7809** | 0.7216 | 0.7223 | 0.6446 | 0.7297 | C39 | **0.9024** | 0.7182 | 0.7520 | 0.6210 | 0.7561 |
| C12 | **0.7991** | 0.7390 | 0.7696 | 0.6401 | 0.7607 | C40 | **0.8227** | 0.7252 | 0.7323 | 0.4900 | 0.7426 |
| C13 | **0.8198** | 0.7745 | 0.7700 | 0.7647 | 0.7863 | C41 | **0.8286** | 0.6926 | 0.7326 | 0.4040 | 0.7062 |
| C14 | **0.8154** | 0.7337 | 0.7522 | 0.6911 | 0.7697 | C42 | **0.8631** | 0.7319 | 0.7460 | 0.4668 | 0.7371 |
| C15 | **0.8602** | 0.8265 | 0.8045 | 0.7545 | 0.8329 | C43 | **0.8765** | 0.8171 | 0.8160 | 0.7031 | 0.8174 |
| C16 | **0.8574** | 0.7830 | 0.8039 | 0.7229 | 0.8056 | C44 | **0.9057** | 0.8466 | 0.8640 | 0.7709 | 0.8832 |
| C17 | **0.8700** | 0.7466 | 0.7860 | 0.5935 | 0.7481 | C45 | **0.8429** | 0.6700 | 0.7032 | 0.5225 | 0.6839 |
| C18 | **0.8779** | 0.7918 | 0.8138 | 0.6427 | 0.7897 | C46 | **0.8098** | 0.6913 | 0.6840 | 0.4081 | 0.6910 |
| C19 | **0.9046** | 0.7866 | 0.7981 | 0.6347 | 0.7905 | C47 | **0.7772** | 0.6223 | 0.6535 | 0.4538 | 0.6651 |
| C20 | **0.7867** | 0.6841 | 0.6858 | 0.3802 | 0.6661 | C48 | **0.8853** | 0.8102 | 0.8249 | 0.7315 | 0.8320 |
| C21 | **0.8596** | 0.7815 | 0.8100 | 0.6693 | 0.8181 | C49 | **0.8000** | 0.6537 | 0.6843 | 0.4387 | 0.6582 |
| C22 | **0.7174** | 0.6740 | 0.6805 | 0.5859 | 0.6805 | C50 | **0.9022** | 0.8475 | 0.8737 | 0.7206 | 0.8473 |
| C23 | **0.8420** | 0.7880 | 0.8000 | 0.6814 | 0.8004 | C51 | **0.8336** | 0.7082 | 0.7339 | 0.4612 | 0.7280 |
| C24 | **0.9183** | 0.8281 | 0.8526 | 0.7418 | 0.8650 | C52 | **0.8563** | 0.7463 | 0.7555 | 0.5477 | 0.7500 |
| C25 | **0.8122** | 0.7610 | 0.7679 | 0.6350 | 0.7684 | C53 | **0.8042** | 0.6599 | 0.6715 | 0.4454 | 0.6800 |
| C26 | **0.8769** | 0.7691 | 0.7990 | 0.5287 | 0.7830 | C54 | **0.8457** | 0.7981 | 0.7957 | 0.6675 | 0.8042 |
| C27 | **0.8770** | 0.7685 | 0.7943 | 0.6370 | 0.7956 | C55 | **0.8608** | 0.7951 | 0.7946 | 0.6730 | 0.8004 |
| C28 | **0.8721** | 0.7905 | 0.8029 | 0.7049 | 0.8018 | C56 | **0.8675** | 0.7994 | 0.7894 | 0.6078 | 0.8055 |

Appendix 8. Metrics C, IGD, Rnd and HV comparisons of JSM with NJSM

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ins. | JSM(A) vs NJSM(B) | | IGD | | Rnd | | HV | |
|  | C(A,B) | C(B,A) | JSM | NJSM | JSM | NJSM | JSM | NJSM |
| C01 | 0.3750 | **0.5000** | **0.0332** | 0.0619 | 0.4737 | **0.5263** | **0.7194** | 0.6780 |
| C02 | **0.7857** | 0.0000 | **0.0088** | 0.1273 | **0.8800** | 0.1200 | **0.7649** | 0.5980 |
| C03 | **1.0000** | 0.0000 | **0.0000** | 0.4619 | **1.0000** | 0.0000 | **0.9054** | 0.3028 |
| C04 | **1.0000** | 0.0000 | **0.0000** | 0.2883 | **1.0000** | 0.0000 | **0.8037** | 0.3992 |
| C05 | **1.0000** | 0.0000 | **0.0000** | 0.2413 | **1.0000** | 0.0000 | **0.8324** | 0.4559 |
| C06 | **0.3333** | 0.2500 | **0.0229** | 0.1327 | **0.6923** | 0.3077 | **0.7542** | 0.6446 |
| C07 | 0.2941 | **0.3939** | **0.0257** | 0.1819 | **0.6250** | 0.3750 | **0.6209** | 0.5625 |
| C08 | **1.0000** | 0.0000 | **0.0000** | 0.3297 | **1.0000** | 0.0000 | **0.8054** | 0.3693 |
| C09 | 0.0625 | **0.4375** | **0.0288** | 0.1910 | **0.5455** | 0.4545 | **0.6643** | 0.6119 |
| C10 | **0.3077** | 0.1563 | **0.0142** | 0.1422 | **0.7500** | 0.2500 | **0.7042** | 0.5973 |
| C11 | **0.5625** | 0.1250 | **0.0060** | 0.1462 | **0.8000** | 0.2000 | **0.5072** | 0.4052 |
| C12 | **1.0000** | 0.0000 | **0.0000** | 0.2278 | **1.0000** | 0.0000 | **0.6805** | 0.4351 |
| C13 | 0.2222 | **0.2308** | **0.0517** | 0.1304 | **0.5882** | 0.4118 | 0.6342 | **0.6455** |
| C14 | 0.0588 | **0.3529** | **0.0345** | 0.1184 | **0.5789** | 0.4211 | **0.7381** | 0.6232 |
| C15 | **0.5500** | 0.1034 | **0.0148** | 0.1329 | **0.7429** | 0.2571 | **0.8093** | 0.6625 |
| C16 | **1.0000** | 0.0000 | **0.0000** | 0.2491 | **1.0000** | 0.0000 | **0.6508** | 0.3501 |
| C17 | **1.0000** | 0.0000 | **0.0000** | 0.4268 | **1.0000** | 0.0000 | **0.8165** | 0.2830 |
| C18 | **1.0000** | 0.0000 | **0.0000** | 0.5274 | **1.0000** | 0.0000 | **0.8424** | 0.2074 |
| C19 | **1.0000** | 0.0000 | **0.0000** | 0.6939 | **1.0000** | 0.0000 | **0.8681** | 0.0600 |
| C20 | **1.0000** | 0.0000 | **0.0000** | 0.5860 | **1.0000** | 0.0000 | **0.8507** | 0.1493 |
| C21 | **1.0000** | 0.0000 | **0.0000** | 0.4367 | **1.0000** | 0.0000 | **0.7357** | 0.2395 |
| C22 | **0.3077** | 0.2927 | **0.0132** | 0.1435 | **0.7632** | 0.2368 | **0.6008** | 0.4944 |
| C23 | **1.0000** | 0.0000 | **0.0000** | 0.2950 | **1.0000** | 0.0000 | **0.6516** | 0.3992 |
| C24 | **1.0000** | 0.0000 | **0.0000** | 0.5503 | **1.0000** | 0.0000 | **0.6466** | 0.0781 |
| C25 | **1.0000** | 0.0000 | **0.0000** | 0.3002 | **1.0000** | 0.0000 | **0.7268** | 0.3406 |
| C26 | **1.0000** | 0.0000 | **0.0000** | 0.6562 | **1.0000** | 0.0000 | **0.8670** | 0.1254 |
| C27 | **1.0000** | 0.0000 | **0.0000** | 0.3497 | **1.0000** | 0.0000 | **0.6662** | 0.2252 |
| C28 | **1.0000** | 0.0000 | **0.0000** | 0.2330 | **1.0000** | 0.0000 | **0.7091** | 0.3494 |
| C29 | **1.0000** | 0.0000 | **0.0000** | 0.4089 | **1.0000** | 0.0000 | **0.7645** | 0.2232 |
| C30 | **1.0000** | 0.0000 | **0.0000** | 0.4711 | **1.0000** | 0.0000 | **0.7022** | 0.1703 |
| C31 | **1.0000** | 0.0000 | **0.0000** | 0.3686 | **1.0000** | 0.0000 | **0.7997** | 0.2841 |
| C32 | **0.4545** | 0.2857 | **0.0158** | 0.2298 | **0.8333** | 0.1667 | **0.5766** | 0.4627 |
| C33 | **1.0000** | 0.0000 | **0.0000** | 0.3692 | **1.0000** | 0.0000 | **0.7008** | 0.2301 |
| C34 | **1.0000** | 0.0000 | **0.0000** | 0.3155 | **1.0000** | 0.0000 | **0.4526** | 0.1854 |
| C35 | **0.3571** | 0.1136 | **0.0037** | 0.2304 | **0.8125** | 0.1875 | **0.6762** | 0.3858 |
| C36 | **1.0000** | 0.0000 | **0.0000** | 0.4465 | **1.0000** | 0.0000 | **0.5997** | 0.1345 |
| C37 | **1.0000** | 0.0000 | **0.0000** | 0.6718 | **1.0000** | 0.0000 | **0.7395** | 0.0668 |
| C38 | **1.0000** | 0.0000 | **0.0000** | 0.8013 | **1.0000** | 0.0000 | **0.9432** | 0.0764 |
| C39 | **1.0000** | 0.0000 | **0.0000** | 0.8368 | **1.0000** | 0.0000 | **0.9774** | 0.0813 |
| C40 | **1.0000** | 0.0000 | **0.0000** | 0.6289 | **1.0000** | 0.0000 | **0.8819** | 0.1475 |
| C41 | **1.0000** | 0.0000 | **0.0000** | 0.9754 | **1.0000** | 0.0000 | **0.9079** | 0.0132 |
| C42 | **1.0000** | 0.0000 | **0.0000** | 0.6828 | **1.0000** | 0.0000 | **0.7391** | 0.0650 |
| C43 | **1.0000** | 0.0000 | **0.0000** | 0.4180 | **1.0000** | 0.0000 | **0.7900** | 0.2507 |
| C44 | **1.0000** | 0.0000 | **0.0000** | 0.6352 | **1.0000** | 0.0000 | **0.7611** | 0.0707 |
| C45 | **1.0000** | 0.0000 | **0.0000** | 0.8373 | **1.0000** | 0.0000 | **0.9072** | 0.0597 |
| C46 | **1.0000** | 0.0000 | **0.0000** | 0.7291 | **1.0000** | 0.0000 | **0.7799** | 0.0456 |
| C47 | **1.0000** | 0.0000 | **0.0000** | 0.5107 | **1.0000** | 0.0000 | **0.7284** | 0.1047 |
| C48 | **1.0000** | 0.0000 | **0.0000** | 0.6593 | **1.0000** | 0.0000 | **0.5597** | 0.0333 |
| C49 | **1.0000** | 0.0000 | **0.0000** | 0.6804 | **1.0000** | 0.0000 | **0.7553** | 0.0470 |
| C50 | **1.0000** | 0.0000 | **0.0000** | 0.7156 | **1.0000** | 0.0000 | **0.7388** | 0.0526 |
| C51 | **1.0000** | 0.0000 | **0.0000** | 0.6857 | **1.0000** | 0.0000 | **0.7652** | 0.0302 |
| C52 | **1.0000** | 0.0000 | **0.0000** | 0.6084 | **1.0000** | 0.0000 | **0.6813** | 0.0764 |
| C53 | **1.0000** | 0.0000 | **0.0000** | 0.5886 | **1.0000** | 0.0000 | **0.6592** | 0.0294 |
| C54 | **1.0000** | 0.0000 | **0.0000** | 0.4294 | **1.0000** | 0.0000 | **0.7418** | 0.1712 |
| C55 | **1.0000** | 0.0000 | **0.0000** | 0.6087 | **1.0000** | 0.0000 | **0.5735** | 0.0432 |
| C56 | **1.0000** | 0.0000 | **0.0000** | 0.5888 | **1.0000** | 0.0000 | **0.7769** | 0.0886 |