**Table 1** Average results for all algorithms with respect to different levels of number of clusters for Case-1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **K-PS-D** |  |  |  | **K-D** |  |  |  | **WC** |  |  |  |
| **|K|** | **|C|** | **|J|** | **MCUS** | **SCUS** | **MCVS** | **SCVS** | **MCUS** | **SCUS** | **MCVS** | **SCVS** | **MCUS** | **SCUS** | **MCVS** | **SCVS** |
| 3 | 3 | 4 | 0.748 | 0.380 | 0.690 | 0.396 | 0.723 | 0.426 | 0.699 | 0.396 | 0.693 | 1.100 | 0.773 | 1.103 |
| 3 | 3 | 8 | 1.129 | 0.293 | 0.863 | 0.302 | 1.114 | 0.303 | 0.833 | 0.268 | 0.870 | 1.098 | 1.002 | 1.092 |
| 3 | 3 | 12 | 1.430 | 0.228 | 1.062 | 0.211 | 1.458 | 0.212 | 1.187 | 0.208 | 1.029 | 1.016 | 1.302 | 1.021 |
| 3 | 6 | 4 | 1.496 | 0.429 | 1.463 | 0.431 | 1.569 | 0.474 | 1.543 | 0.483 | 1.605 | 1.185 | 1.622 | 1.186 |
| 3 | 6 | 8 | 1.838 | 0.274 | 1.734 | 0.272 | 1.918 | 0.243 | 1.823 | 0.290 | 1.748 | 1.259 | 1.856 | 1.261 |
| 3 | 6 | 12 | 4.416 | 1.004 | 3.127 | 1.102 | 4.529 | 0.980 | 4.104 | 1.000 | 3.918 | 2.884 | 4.022 | 2.875 |
| 3 | 9 | 4 | 1.940 | 0.448 | 1.923 | 0.455 | 2.094 | 0.461 | 2.099 | 0.463 | 2.210 | 1.213 | 2.170 | 1.213 |
| 3 | 9 | 8 | 2.335 | 0.278 | 2.290 | 0.311 | 2.465 | 0.300 | 2.409 | 0.315 | 2.432 | 1.343 | 2.485 | 1.345 |
| 3 | 9 | 12 | 2.569 | 0.200 | 2.396 | 0.129 | 2.685 | 0.149 | 2.461 | 0.162 | 2.439 | 1.338 | 2.489 | 1.336 |
| 6 | 3 | 4 | 0.740 | 0.414 | 0.699 | 0.450 | 0.721 | 0.405 | 0.699 | 0.470 | 0.707 | 1.104 | 0.814 | 1.105 |
| 6 | 3 | 8 | 1.080 | 0.212 | 0.855 | 0.272 | 1.059 | 0.246 | 0.873 | 0.279 | 0.833 | 1.038 | 1.057 | 1.031 |
| 6 | 3 | 12 | 1.334 | 0.201 | 0.986 | 0.199 | 1.399 | 0.209 | 1.020 | 0.214 | 0.980 | 1.021 | 1.281 | 1.036 |
| 6 | 6 | 4 | 1.299 | 0.331 | 1.262 | 0.335 | 1.383 | 0.389 | 1.364 | 0.395 | 1.432 | 1.021 | 1.425 | 1.024 |
| 6 | 6 | 8 | 1.852 | 0.257 | 1.724 | 0.288 | 1.894 | 0.260 | 1.840 | 0.299 | 1.737 | 1.280 | 1.951 | 1.276 |
| 6 | 6 | 12 | 2.114 | 0.169 | 1.902 | 0.182 | 2.206 | 0.162 | 1.937 | 0.152 | 1.813 | 1.254 | 1.978 | 1.251 |
| 6 | 9 | 4 | 1.831 | 0.417 | 1.828 | 0.417 | 2.002 | 0.446 | 1.997 | 0.402 | 2.119 | 1.159 | 2.075 | 1.155 |
| 6 | 9 | 8 | 2.392 | 0.289 | 2.308 | 0.293 | 2.488 | 0.332 | 2.416 | 0.269 | 2.479 | 1.354 | 2.491 | 1.348 |
| 6 | 9 | 12 | 2.654 | 0.196 | 2.404 | 0.165 | 2.734 | 0.184 | 2.550 | 0.187 | 2.533 | 1.358 | 2.558 | 1.360 |
| 9 | 3 | 4 | 0.609 | 0.329 | 0.592 | 0.374 | 0.612 | 0.350 | 0.593 | 0.390 | 0.600 | 0.991 | 0.725 | 0.991 |
| 9 | 3 | 8 | 1.102 | 0.267 | 0.799 | 0.299 | 1.064 | 0.274 | 0.887 | 0.305 | 0.843 | 1.045 | 1.019 | 1.044 |
| 9 | 3 | 12 | 1.455 | 0.204 | 1.204 | 0.210 | 1.433 | 0.224 | 1.084 | 0.201 | 1.006 | 1.074 | 1.384 | 1.078 |
| 9 | 6 | 4 | 1.236 | 0.340 | 1.264 | 0.378 | 1.328 | 0.360 | 1.368 | 0.379 | 1.380 | 1.024 | 1.435 | 1.023 |
| 9 | 6 | 8 | 1.861 | 0.319 | 1.736 | 0.285 | 1.984 | 0.309 | 1.853 | 0.311 | 1.831 | 1.292 | 1.947 | 1.291 |
| 9 | 6 | 12 | 2.226 | 0.174 | 1.936 | 0.163 | 2.291 | 0.152 | 2.049 | 0.160 | 1.864 | 1.248 | 2.007 | 1.246 |
| 9 | 9 | 4 | 1.797 | 0.437 | 1.805 | 0.361 | 1.974 | 0.416 | 1.988 | 0.392 | 2.065 | 1.137 | 2.004 | 1.137 |
| 9 | 9 | 8 | 2.332 | 0.249 | 2.298 | 0.252 | 2.451 | 0.273 | 2.390 | 0.344 | 2.453 | 1.342 | 2.464 | 1.340 |
| 9 | 9 | 12 | 2.629 | 0.168 | 2.376 | 0.156 | 2.718 | 0.145 | 2.560 | 0.139 | 2.520 | 1.352 | 2.578 | 1.354 |
|  |  |  | **1.794** | **0.315** | **1.612** | **0.322** | **1.863** | **0.322** | **1.727** | **0.329** | **1.709** | **1.242** | **1.812** | **1.242** |

**Table 1** continued for Case-4 (Case-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **K-PS-D** |  |  |  | **K-D** |  |  |  | **WC** |  |  |  |
| **|K|** | **|C|** | **|J|** | **MCUS** | **SCUS** | **MCVS** | **SCVS** | **MCUS** | **SCUS** | **MCVS** | **SCVS** | **MCUS** | **SCUS** | **MCVS** | **SCVS** |
| 3 | 3 | 4 | 0.998 | 0.262 | 0.975 | 0.292 | 0.992 | 0.226 | 0.985 | 0.255 | 0.984 | 0.696 | 1.040 | 0.692 |
| 3 | 3 | 8 | 1.318 | 0.182 | 1.131 | 0.212 | 1.349 | 0.202 | 1.121 | 0.173 | 1.139 | 0.721 | 1.223 | 0.718 |
| 3 | 3 | 12 | 1.509 | 0.145 | 1.327 | 0.156 | 1.511 | 0.149 | 1.377 | 0.150 | 1.227 | 0.681 | 1.397 | 0.683 |
| 3 | 6 | 4 | 1.497 | 0.293 | 1.488 | 0.241 | 1.539 | 0.292 | 1.569 | 0.271 | 1.585 | 0.734 | 1.602 | 0.736 |
| 3 | 6 | 8 | 1.740 | 0.151 | 1.657 | 0.176 | 1.790 | 0.172 | 1.704 | 0.157 | 1.708 | 0.783 | 1.799 | 0.784 |
| 3 | 6 | 12 | 2.169 | 0.239 | 1.900 | 0.119 | 2.127 | 0.146 | 1.940 | 0.148 | 1.842 | 0.849 | 1.924 | 0.848 |
| 3 | 9 | 4 | 1.735 | 0.263 | 1.753 | 0.261 | 1.844 | 0.244 | 1.868 | 0.247 | 1.938 | 0.708 | 1.884 | 0.709 |
| 3 | 9 | 8 | 2.143 | 0.183 | 2.067 | 0.198 | 2.203 | 0.197 | 2.176 | 0.194 | 2.182 | 0.848 | 2.223 | 0.846 |
| 3 | 9 | 12 | 2.253 | 0.081 | 2.072 | 0.083 | 2.300 | 0.098 | 2.174 | 0.096 | 2.146 | 0.827 | 2.172 | 0.823 |
| 6 | 3 | 4 | 1.010 | 0.235 | 0.981 | 0.318 | 1.010 | 0.247 | 0.995 | 0.303 | 0.988 | 0.686 | 1.038 | 0.685 |
| 6 | 3 | 8 | 1.290 | 0.162 | 1.104 | 0.189 | 1.262 | 0.188 | 1.121 | 0.202 | 1.096 | 0.691 | 1.265 | 0.688 |
| 6 | 3 | 12 | 1.443 | 0.144 | 1.214 | 0.144 | 1.409 | 0.136 | 1.229 | 0.141 | 1.173 | 0.649 | 1.359 | 0.649 |
| 6 | 6 | 4 | 1.493 | 0.279 | 1.502 | 0.260 | 1.547 | 0.274 | 1.557 | 0.298 | 1.600 | 0.736 | 1.608 | 0.734 |
| 6 | 6 | 8 | 1.813 | 0.172 | 1.721 | 0.164 | 1.876 | 0.197 | 1.780 | 0.198 | 1.743 | 0.832 | 1.869 | 0.833 |
| 6 | 6 | 12 | 2.019 | 0.125 | 1.824 | 0.107 | 2.069 | 0.133 | 1.896 | 0.107 | 1.795 | 0.816 | 1.931 | 0.814 |
| 6 | 9 | 4 | 1.766 | 0.258 | 1.767 | 0.257 | 1.846 | 0.247 | 1.866 | 0.241 | 1.983 | 0.729 | 1.928 | 0.731 |
| 6 | 9 | 8 | 2.103 | 0.189 | 2.035 | 0.161 | 2.183 | 0.205 | 2.122 | 0.184 | 2.183 | 0.839 | 2.164 | 0.838 |
| 6 | 9 | 12 | 2.222 | 0.098 | 2.089 | 0.091 | 2.294 | 0.112 | 2.202 | 0.083 | 2.178 | 0.817 | 2.177 | 0.818 |
| 9 | 3 | 4 | 1.100 | 0.300 | 1.066 | 0.300 | 1.096 | 0.323 | 1.099 | 0.327 | 1.076 | 0.779 | 1.170 | 0.778 |
| 9 | 3 | 8 | 1.275 | 0.189 | 1.102 | 0.196 | 1.295 | 0.162 | 1.152 | 0.171 | 1.118 | 0.698 | 1.245 | 0.701 |
| 9 | 3 | 12 | 1.498 | 0.145 | 1.309 | 0.138 | 1.599 | 0.144 | 1.404 | 0.151 | 1.245 | 0.710 | 1.494 | 0.710 |
| 9 | 6 | 4 | 1.460 | 0.278 | 1.474 | 0.300 | 1.527 | 0.257 | 1.522 | 0.290 | 1.564 | 0.746 | 1.615 | 0.745 |
| 9 | 6 | 8 | 1.911 | 0.204 | 1.792 | 0.198 | 1.940 | 0.211 | 1.850 | 0.192 | 1.845 | 0.858 | 1.964 | 0.855 |
| 9 | 6 | 12 | 2.076 | 0.142 | 1.907 | 0.111 | 2.165 | 0.155 | 1.976 | 0.124 | 1.855 | 0.840 | 1.966 | 0.835 |
| 9 | 9 | 4 | 1.848 | 0.266 | 1.860 | 0.281 | 1.975 | 0.263 | 1.963 | 0.285 | 2.042 | 0.762 | 1.991 | 0.763 |
| 9 | 9 | 8 | 2.109 | 0.190 | 2.045 | 0.178 | 2.173 | 0.186 | 2.123 | 0.205 | 2.168 | 0.833 | 2.200 | 0.833 |
| 9 | 9 | 12 | 2.241 | 0.087 | 2.125 | 0.084 | 2.345 | 0.081 | 2.195 | 0.083 | 2.199 | 0.833 | 2.212 | 0.829 |
|  |  |  | **1.705** | **0.195** | **1.603** | **0.193** | **1.751** | **0.194** | **1.665** | **0.195** | **1.652** | **0.767** | **1.721** | **0.766** |