For the instance: **u\_s\_hihi\_512\_16.txt:**

We have tuned the parameters crossover and mutation probability, for three values each, which results in 9 possible algorithms. We ran each algorithm 50 times and collected the results. The results were further processed in Matlab, with the Kruskal-Wallis test.

The values tested were:

Algorithm 1: pc=0.8, pm=0.001953125 (1/512)

Algorithm 2: pc=0.6, pm=0.001953125 (1/512)

Algorithm 3: pc=1.0, pm=0.001953125 (1/512)

Algorithm 4: pc=1.0, pm=0.00390625 (1/512)

Algorithm 5: pc=0.6, pm=0.00390625 (2/512)

Algorithm 6: pc=0.8, pm=0.00390625 (2/512)

Algorithm 7: pc=0.8, pm=9.765625E-4 (0.5/512)

Algorithm 8: pc=0.6, pm=9.765625E-4 (0.5/512)

Algorithm 9: pc=1.0, pm=9.765625E-4 (0.5/512)



Our data:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alg1 | Alg2 | Alg3 | Alg4 | Alg5 | Alg6 | Alg7 | Alg8 | Alg9 |
| 1 | 26594395 | 25827243 | 26342091 | 26401053 | 26692129 | 27252061 | 27386220 | 25268109 | 26730117 |
| 2 | 27033346 | 26691659 | 25133489 | 25686431 | 24325386 | 26317239 | 27072528 | 26551773 | 26188261 |
| 3 | 27364718 | 27041751 | 25504343 | 27218389 | 25069822 | 27342290 | 27192246 | 26904594 | 25939730 |
| 4 | 25889296 | 25813770 | 25871440 | 26833533 | 26814483 | 26833017 | 25328776 | 25415389 | 25989096 |
| 5 | 26474980 | 26745896 | 26672764 | 26693418 | 27364920 | 27010498 | 26768679 | 26046592 | 24866368 |
| 6 | 27095611 | 26664714 | 26476074 | 27280296 | 25848873 | 25112606 | 26004897 | 27230748 | 27062763 |
| 7 | 26493422 | 27119310 | 26506886 | 27842227 | 26594802 | 26438128 | 26890947 | 27509745 | 26993575 |
| 8 | 26897736 | 27100301 | 27281816 | 25904689 | 26744623 | 26326812 | 25926142 | 27514051 | 27000559 |
| 9 | 25965540 | 27171977 | 26202433 | 26462369 | 26752628 | 27086764 | 26801473 | 27332045 | 26901126 |
| 10 | 26066978 | 27451665 | 25371683 | 26829451 | 26472045 | 27415848 | 26818930 | 27098449 | 25678367 |
| 11 | 26454109 | 26927610 | 27137803 | 26110625 | 27480172 | 26538533 | 26292431 | 26937334 | 26024443 |
| 12 | 26438318 | 26730249 | 27151746 | 26183676 | 26306641 | 26685167 | 25939838 | 26403717 | 26983695 |
| 13 | 26451776 | 26682255 | 27006431 | 26327865 | 25578294 | 25860777 | 26231173 | 26851887 | 26790041 |
| 14 | 25926304 | 26807010 | 27533559 | 26759405 | 26796393 | 27443000 | 27066550 | 25378799 | 26563600 |
| 15 | 25631190 | 27240909 | 25978881 | 25182339 | 27910700 | 25908068 | 26723136 | 26346249 | 26294140 |
| 16 | 26273749 | 27467896 | 26704479 | 26747855 | 26908168 | 26486038 | 25844965 | 26807232 | 26132867 |
| 17 | 26742412 | 27127287 | 25157040 | 26273839 | 26800916 | 26707223 | 27239953 | 26488256 | 25763326 |
| 18 | 25589119 | 27008843 | 26709634 | 26571189 | 27257358 | 26419142 | 27227354 | 26073602 | 24538806 |
| 19 | 26711424 | 27317566 | 26562414 | 26937609 | 27307220 | 26606427 | 26511442 | 26531662 | 26532324 |
| 20 | 26872270 | 27318356 | 26157490 | 26589493 | 26568873 | 26697749 | 25896742 | 26335463 | 25090882 |
| 21 | 26466776 | 26458811 | 26190578 | 25723812 | 25525759 | 27150187 | 26310043 | 26743261 | 25556788 |
| 22 | 26177981 | 26472676 | 26157050 | 26706725 | 27214120 | 25633757 | 25971090 | 27022907 | 27023630 |
| 23 | 26399450 | 26080163 | 26731043 | 26763806 | 26236101 | 26309618 | 27293115 | 27106528 | 26589459 |
| 24 | 27107922 | 27215332 | 26995136 | 26481351 | 26945347 | 26063753 | 26075752 | 26543842 | 26887636 |
| 25 | 26266433 | 26440883 | 26200569 | 27016693 | 26834188 | 26957698 | 26107975 | 26737263 | 25484291 |
| 26 | 26780305 | 27197957 | 26787494 | 25964798 | 26470691 | 26830400 | 26681135 | 26872360 | 26273723 |
| 27 | 26029602 | 26452449 | 25936509 | 25985569 | 27004891 | 26200262 | 26322213 | 26346221 | 26795384 |
| 28 | 25539606 | 26646493 | 25883356 | 25440559 | 26495150 | 25885208 | 25742487 | 26992738 | 26259833 |
| 29 | 26488870 | 25652329 | 26253236 | 25561647 | 26410444 | 27068430 | 26930466 | 26799551 | 27035400 |
| 30 | 25907675 | 26865274 | 26813952 | 26398826 | 27632668 | 25981114 | 26867838 | 27471605 | 26187471 |
| 31 | 26622681 | 26220706 | 26127958 | 26092832 | 25634536 | 27317033 | 27548241 | 26783840 | 26319888 |
| 32 | 26898313 | 26476630 | 26450020 | 27180858 | 26635996 | 26886612 | 26307371 | 26592434 | 26449263 |
| 33 | 26424556 | 26842881 | 26142145 | 24935552 | 26568479 | 27167194 | 26639652 | 26796633 | 27089516 |
| 34 | 25870696 | 27060088 | 25714339 | 26111659 | 26647930 | 26403835 | 26821342 | 26980971 | 26637698 |
| 35 | 25735548 | 26473513 | 25794663 | 26864925 | 26341157 | 26998252 | 26962944 | 25350776 | 26625280 |
| 36 | 27326426 | 26203892 | 26130670 | 26760895 | 25858973 | 26969864 | 26075493 | 26427182 | 26376142 |
| 37 | 26808832 | 26739519 | 25962969 | 24978156 | 27785568 | 26059265 | 26164432 | 25586427 | 26353374 |
| 38 | 25789128 | 26421911 | 27049981 | 26399742 | 26908697 | 26815110 | 26399459 | 25871406 | 26566075 |
| 39 | 25522315 | 26507885 | 26639062 | 26234438 | 26792049 | 26220877 | 26497170 | 27523824 | 26253296 |
| 40 | 26740842 | 26765608 | 26444165 | 26741555 | 26228519 | 27146296 | 26727608 | 27555155 | 26877820 |
| 41 | 26096419 | 26981057 | 26074336 | 25819799 | 26548532 | 27247522 | 26860832 | 26902932 | 26545780 |
| 42 | 24686216 | 26369027 | 25921481 | 26161220 | 26672685 | 26125063 | 27422401 | 27747923 | 25134235 |
| 43 | 27090203 | 27199209 | 26208430 | 26018638 | 26434046 | 27023816 | 26454344 | 25253503 | 26254867 |
| 44 | 26669205 | 27114238 | 26472156 | 25964060 | 25072897 | 25840173 | 26288524 | 27289602 | 26470600 |
| 45 | 25302155 | 25741969 | 26860805 | 26561732 | 26475937 | 27387669 | 25693190 | 27479792 | 26822716 |
| 46 | 26080895 | 25854347 | 26587446 | 26610997 | 26228505 | 26315194 | 27058614 | 26837980 | 25997518 |
| 47 | 26477969 | 27102455 | 26266558 | 26164946 | 26843446 | 26715690 | 26800452 | 27065513 | 25722062 |
| 48 | 27601653 | 26573529 | 24923826 | 25697051 | 26949602 | 26479819 | 26688299 | 26890964 | 26095462 |
| 49 | 26554091 | 26436355 | 26935687 | 25168551 | 26216639 | 26804592 | 27698261 | 25174993 | 27320377 |
| 50 | 25644571 | 26434335 | 26256067 | 26034195 | 27080384 | 26512473 | 26500259 | 27274382 | 26577638 |

The p values per pairs of algorithms:



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Alg A | Alg B |  |  |  | P Value |
| 1 | 2 | -158.8948 | -78.2200 | 2.4548 | 0.0658 |
| 1 | 3 | -71.6348 | 9.0400 | 89.7148 | 1.0000 |
| 1 | 4 | -69.6948 | 10.9800 | 91.6548 | 1.0000 |
| 1 | 5 | -131.8348 | -51.1600 | 29.5148 | 0.5666 |
| 1 | 6 | -139.0148 | -58.3400 | 22.3348 | 0.3776 |
| 1 | 7 | -126.5548 | -45.8800 | 34.7948 | 0.7061 |
| 1 | 8 | -156.5148 | -75.8400 | 4.8348 | 0.0849 |
| 1 | 9 | -81.5948 | -0.9200 | 79.7548 | 1.0000 |
| 2 | 3 | 6.5852 | 87.2600 | 167.9348 | 0.0226 |
| 2 | 4 | 8.5252 | 89.2000 | 169.8748 | 0.0176 |
| 2 | 5 | -53.6148 | 27.0600 | 107.7348 | 0.9820 |
| 2 | 6 | -60.7948 | 19.8800 | 100.5548 | 0.9978 |
| 2 | 7 | -48.3348 | 32.3400 | 113.0148 | 0.9469 |
| 2 | 8 | -78.2948 | 2.3800 | 83.0548 | 1.0000 |
| 2 | 9 | -3.3748 | 77.3000 | 157.9748 | 0.0727 |
| 3 | 4 | -78.7348 | 1.9400 | 82.6148 | 1.0000 |
| 3 | 5 | -140.8748 | -60.2000 | 20.4748 | 0.3331 |
| 3 | 6 | -148.0548 | -67.3800 | 13.2948 | 0.1904 |
| 3 | 7 | -135.5948 | -54.9200 | 25.7548 | 0.4652 |
| 3 | 8 | -165.5548 | -84.8800 | -4.2052 | 0.0304 |
| 3 | 9 | -90.6348 | -9.9600 | 70.7148 | 1.0000 |
| 4 | 5 | -142.8148 | -62.1400 | 18.5348 | 0.2898 |
| 4 | 6 | -149.9948 | -69.3200 | 11.3548 | 0.1604 |
| 4 | 7 | -137.5348 | -56.8600 | 23.8148 | 0.4147 |
| 4 | 8 | -167.4948 | -86.8200 | -6.1452 | 0.0239 |
| 4 | 9 | -92.5748 | -11.9000 | 68.7748 | 1.0000 |
| 5 | 6 | -87.8548 | -7.1800 | 73.4948 | 1.0000 |
| 5 | 7 | -75.3948 | 5.2800 | 85.9548 | 1.0000 |
| 5 | 8 | -105.3548 | -24.6800 | 55.9948 | 0.9901 |
| 5 | 9 | -30.4348 | 50.2400 | 130.9148 | 0.5916 |
| 6 | 7 | -68.2148 | 12.4600 | 93.1348 | 0.9999 |
| 6 | 8 | -98.1748 | -17.5000 | 63.1748 | 0.9991 |
| 6 | 9 | -23.2548 | 57.4200 | 138.0948 | 0.4005 |
| 7 | 8 | -110.6348 | -29.9600 | 50.7148 | 0.9661 |
| 7 | 9 | -35.7148 | 44.9600 | 125.6348 | 0.7289 |
| 8 | 9 | -5.7548 | 74.9200 | 155.5948 | 0.0934 |

Based on the information gathered we have chosen to go ahead with algorithm 4 for this problem instance.