

# Results

May 9, 2024

## 1 Tables of Friedman, Bonferroni-Dunn, Holm, Hochberg and Hommel Tests

Table 1: Average Rankings of the algorithms

Algorithm	Ranking
SPT	3.01
—Rule-DDQN—MachineCompressed-model-4	3.01
—Rule-DDQN—Complete-model-1	3.21
—Rule-PPO—MachineCompressed-model-6	3.94
LWRK	4.76
—Rule-PPO—Complete-model-3	4.25
MS	7.21
WINQ	7.76
—Flexible-DDQN—MachineCompressed-model-7	9.70
—Flexible-PPO—Complete-model-1	9.92
—Flexible-DDQN—Complete-model-0	11.69
Random	12.16
—Flexible-PPO—Complete-model-3	10.38

Friedman statistic considering reduction performance (distributed according to chi-square with 12 degrees of freedom: 953.6189010988974.  
P-value computed by Friedman Test: 2.6650781581594174E-10.

Iman and Davenport statistic considering reduction performance (distributed according to F-distribution with 12 and 1188 degrees of freedom: 383.17984467910145.  
P-value computed by Iman and Daveport Test: 0.0.

Table 2: Holm / Hochberg Table for  $\alpha = 0.05$

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Holm/Hochberg/Hommel
12	Random	16.613495771758622	5.565335860204697E-62	0.004166666666666667
11	—Flexible-DDQN—Complete-model-0	15.760124950695607	5.851717967265271E-56	0.004545454545454546
10	—Flexible-PPO—Complete-model-3	13.381580747307215	7.748180258873034E-41	0.005
9	—Flexible-PPO—Complete-model-1	12.546366752224266	4.161712370256904E-36	0.005555555555555556
8	—Flexible-DDQN—MachineCompressed-model-7	12.146916580662854	5.9570115516192054E-34	0.00625
7	WINQ	8.624492340530438	6.437758837554842E-18	0.0071428571428571435
6	MS	7.625866911626907	2.423998126974424E-14	0.008333333333333333
5	LWRK	3.177444546511209	0.0014857910042988878	0.01
4	—Rule-PPO—Complete-model-3	2.25144642152794	0.024357276756868735	0.0125
3	—Rule-PPO—MachineCompressed-model-6	1.6885848161459556	0.0912990224815342	0.016666666666666666
2	—Rule-DDQN—Complete-model-1	0.3631365196012777	0.7165029052613163	0.025
1	—Rule-DDQN—MachineCompressed-model-4	0.0	1.0	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.004166666666666667$ .

Holm’s procedure rejects those hypotheses that have a p-value  $\leq 0.0125$ .  
Hochberg’s procedure rejects those hypotheses that have a p-value  $\leq 0.01$ .  
Hommel’s procedure rejects those hypotheses that have a p-value  $\leq 0.0125$ .

Table 3: Holm / Hochberg Table for  $\alpha = 0.10$

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Holm/Hochberg/Hommel
12	Random	16.613495771758622	5.565335860204697E-62	0.008333333333333333
11	—Flexible-DDQN—Complete-model-0	15.760124950695607	5.851717967265271E-56	0.009090909090909092
10	—Flexible-PPO—Complete-model-3	13.381580747307215	7.748180258873034E-41	0.01
9	—Flexible-PPO—Complete-model-1	12.546366752224266	4.161712370256904E-36	0.011111111111111112
8	—Flexible-DDQN—MachineCompressed-model-7	12.146916580662854	5.9570115516192054E-34	0.0125
7	WINQ	8.624492340530438	6.437758837554842E-18	0.014285714285714287
6	MS	7.625866911626907	2.423998126974424E-14	0.016666666666666666
5	LWRK	3.177444546511209	0.0014857910042988878	0.02
4	—Rule-PPO—Complete-model-3	2.25144642152794	0.024357276756868735	0.025
3	—Rule-PPO—MachineCompressed-model-6	1.6885848161459556	0.0912990224815342	0.033333333333333333
2	—Rule-DDQN—Complete-model-1	0.3631365196012777	0.7165029052613163	0.05
1	—Rule-DDQN—MachineCompressed-model-4	0.0	1.0	0.1

Bonferroni-Dunn’s procedure rejects those hypotheses that have a p-value  $\leq 0.008333333333333333$ .  
Holm’s procedure rejects those hypotheses that have a p-value  $\leq 0.033333333333333333$ .  
Hochberg’s procedure rejects those hypotheses that have a p-value  $\leq 0.025$ .  
Hommel’s procedure rejects those hypotheses that have a p-value  $\leq 0.016666666666666666$ .

Table 4: Adjusted  $p$ -values

$i$	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	Random	5.565335860204697E-62	6.678403032245636E-61	6.678403032245636E-61	6.678403032245636E-61	6.678403032245636E-61
2	—Flexible-DDQN—Complete-model-0	5.851717967265271E-56	7.022061560718324E-55	6.436889763991798E-55	6.436889763991798E-55	6.436889763991798E-55
3	—Flexible-PPO—Complete-model-3	7.748180258873034E-41	9.297816310647641E-40	7.748180258873034E-40	7.748180258873034E-40	7.748180258873034E-40
4	—Flexible-PPO—Complete-model-1	4.161712370256904E-36	4.994054844308285E-35	3.7455411332312135E-35	3.7455411332312135E-35	3.7455411332312135E-35
5	—Flexible-DDQN—MachineCompressed-model-7	5.9570115516192054E-34	7.148413861943047E-33	4.7656092412953643E-33	4.7656092412953643E-33	4.7656092412953643E-33
6	WINQ	6.437758837554842E-18	7.72531060506581E-17	4.506431186288389E-17	4.506431186288389E-17	4.506431186288389E-17
7	MS	2.423998126974424E-14	2.908797752369309E-13	1.4543988761846545E-13	1.4543988761846545E-13	1.4543988761846545E-13
8	LWRK	0.0014857910042988878	0.017829492051586654	0.007428955021494439	0.007428955021494439	0.007428955021494439
9	—Rule-PPO—Complete-model-3	0.024357276756868735	0.29228732108242483	0.09742910702747494	0.09742910702747494	0.09742910702747494
10	—Rule-PPO—MachineCompressed-model-6	0.0912990224815342	1.0955882697784103	0.27389706744460257	0.27389706744460257	0.27389706744460257
11	—Rule-DDQN—Complete-model-1	0.7165029052613163	8.598034863135796	1.4330058105226327	1.0	1.0
12	—Rule-DDQN—MachineCompressed-model-4	1.0	12.0	1.4330058105226327	1.0	1.0

Nemenyi’s procedure rejects those hypotheses that have a p-value  $\leq 6.41025641025641E - 4$ .  
Holm’s procedure rejects those hypotheses that have a p-value  $\leq 0.002631578947368421$ .  
Shaffer’s procedure rejects those hypotheses that have a p-value  $\leq 6.41025641025641E - 4$ .  
Nemenyi’s procedure rejects those hypotheses that have a p-value  $\leq 0.001282051282051282$ .  
Holm’s procedure rejects those hypotheses that have a p-value  $\leq 0.005555555555555556$ .  
Shaffer’s procedure rejects those hypotheses that have a p-value  $\leq 0.001282051282051282$ .

Table 5: Holm / Shaffer Table for  $\alpha = 0.05$ 

$i$	algorithms	$z = (R_0 - R_i) / SE$	$p$	Holm	Shaffer
78	SPT vs. Random	16.613495771758622	5.565335860204697E-62	6.41025641025641E-4	6.41025641025641E-4
77	—Rule-DDQN—MachineCompressed-model-4 vs. Random	16.613495771758622	5.565335860204697E-62	6.493506493506494E-4	7.575757575757576E-4
76	—Rule-DDQN—Complete-model-1 vs. Random	16.250359252157345	2.220593690700706E-59	6.578947368421052E-4	7.575757575757576E-4
75	SPT vs. —Flexible-DDQN—Complete-model-0	15.760124950695607	5.851717967265271E-56	6.666666666666668E-4	7.575757575757576E-4
74	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-DDQN—Complete-model-0	15.760124950695607	5.851717967265271E-56	6.756756756756757E-4	7.575757575757576E-4
73	—Rule-DDQN—Complete-model-1 vs. —Flexible-DDQN—Complete-model-0	15.39698843109433	1.7147128644077812E-53	6.849315068493151E-4	7.575757575757576E-4
72	—Rule-PPO—MachineCompressed-model-6 vs. Random	14.924910955612667	2.2693832801735977E-50	6.944444444444445E-4	7.575757575757576E-4
71	—Rule-PPO—Complete-model-3 vs. Random	14.362049350230684	8.953972890580004E-47	7.042253521126761E-4	7.575757575757576E-4
70	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-DDQN—Complete-model-0	14.071540134549652	5.681836797615628E-45	7.142857142857143E-4	7.575757575757576E-4
69	—Rule-PPO—Complete-model-3 vs. —Flexible-DDQN—Complete-model-0	13.508678529167668	1.389939921182868E-41	7.246376811594203E-4	7.575757575757576E-4
68	LWRK vs. Random	13.436051225247414	3.7175136888723676E-41	7.352941176470588E-4	7.575757575757576E-4
67	SPT vs. —Flexible-PPO—Complete-model-3	13.381580747307215	7.748180258873034E-41	7.462686567164179E-4	7.575757575757576E-4
66	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-PPO—Complete-model-3	13.381580747307215	7.748180258873034E-41	7.575757575757576E-4	7.575757575757576E-4
65	—Rule-DDQN—Complete-model-1 vs. —Flexible-PPO—Complete-model-3	13.018444227705935	9.610913539771142E-39	7.692307692307692E-4	8.928571428571429E-4
64	LWRK vs. —Flexible-DDQN—Complete-model-0	12.5826804041844	2.6295381235957894E-36	7.8125E-4	8.928571428571429E-4
63	SPT vs. —Flexible-PPO—Complete-model-1	12.546366752224266	4.161712370256904E-36	7.936507936507937E-4	8.928571428571429E-4
62	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-PPO—Complete-model-1	12.546366752224266	4.161712370256904E-36	8.064516129032258E-4	8.928571428571429E-4
61	—Rule-DDQN—Complete-model-1 vs. —Flexible-PPO—Complete-model-1	12.183230232622988	3.8185266798172176E-34	8.19672131147541E-4	8.928571428571429E-4
60	SPT vs. —Flexible-DDQN—MachineCompressed-model-7	12.146916580662854	5.9570115516192054E-34	8.333333333333334E-4	8.928571428571429E-4
59	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-DDQN—MachineCompressed-model-7	12.146916580662854	5.9570115516192054E-34	8.474576271186442E-4	8.928571428571429E-4
58	—Rule-DDQN—Complete-model-1 vs. —Flexible-DDQN—MachineCompressed-model-7	11.783780061061575	4.732222614314352E-32	8.620689655172415E-4	8.928571428571429E-4
57	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-PPO—Complete-model-3	11.692995931161258	1.3841619081506487E-31	8.771929824561404E-4	8.928571428571429E-4
56	—Rule-PPO—Complete-model-3 vs. —Flexible-PPO—Complete-model-3	11.130134325779274	8.950053289856703E-29	8.928571428571429E-4	8.928571428571429E-4
55	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-PPO—Complete-model-1	10.85778193607831	1.831435730711343E-27	9.090909090909091E-4	9.090909090909091E-4
54	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-DDQN—MachineCompressed-model-7	10.458331764516897	1.3419754767775118E-25	9.259259259259259E-4	0.0010416666666666667
53	—Rule-PPO—Complete-model-3 vs. —Flexible-PPO—Complete-model-1	10.294920330696325	7.428103980850365E-25	9.433962264150943E-4	0.0010416666666666667
52	LWRK vs. —Flexible-PPO—Complete-model-3	10.204136200796006	1.9000427416378966E-24	9.615384615384616E-4	0.0010416666666666667
51	—Rule-PPO—Complete-model-3 vs. —Flexible-DDQN—MachineCompressed-model-7	9.895470159134915	4.3555894244377864E-23	9.80392156862745E-4	0.0010416666666666667
50	LWRK vs. —Flexible-PPO—Complete-model-1	9.368922205713057	7.327694413458179E-21	0.001	0.0010416666666666667
49	MS vs. Random	8.987628860131718	2.5262146613034804E-19	0.0010204081632653062	0.0010416666666666667
48	LWRK vs. —Flexible-DDQN—MachineCompressed-model-7	8.969472034151645	2.979390976255843E-19	0.0010416666666666667	0.0010416666666666667
47	SPT vs. WINQ	8.624492340530438	6.437758837554842E-18	0.0010638297872340426	0.0010869565217391304
46	—Rule-DDQN—Complete-model-1 vs. WINQ	8.624492340530438	6.437758837554842E-18	0.0010869565217391304	0.0010869565217391304
45	MS vs. —Flexible-DDQN—Complete-model-0	8.26135582092916	1.4402704338719356E-16	0.0011111111111111111	0.0011111111111111111
44	—Flexible-DDQN—Complete-model-0	8.134258039068701	4.1446888687625874E-16	0.0011363363636363635	0.0011904761904761906
43	WINQ vs. Random	7.9890033431228187	1.3603390829715415E-15	0.0011627906976744186	0.0011904761904761906
42	SPT vs. MS	7.625866911626907	2.423998126974424E-14	0.0011904761904761906	0.0011904761904761906
41	—Rule-DDQN—MachineCompressed-model-4 vs. MS	7.625866911626907	2.423998126974424E-14	0.0012195121951219512	0.001282051282051282
40	—Rule-DDQN—Complete-model-1 vs. MS	7.262730392025628	3.7935359377584177E-13	0.00125	0.001282051282051282
39	WINQ vs. —Flexible-DDQN—Complete-model-0	7.135632610165171	9.634302348721324E-13	0.001282051282051282	0.001282051282051282
38	—Rule-PPO—MachineCompressed-model-6 vs. WINQ	6.935907524384481	4.036215764602311E-12	0.0013157894736842105	0.0013157894736842105
37	—Rule-PPO—Complete-model-3 vs. WINQ	6.373045919002497	1.8531037091929911E-10	0.0013513513513513514	0.0013513513513513514
36	—Rule-PPO—MachineCompressed-model-6 vs. MS	5.937282095480951	2.897858135388802E-9	0.001388888888888889	0.001388888888888889
35	MS vs. —Flexible-PPO—Complete-model-3	5.755713835680307	8.627643188489504E-9	0.0014285714285714286	0.0014705882352941176
34	LWRK vs. WINQ	5.447047794019228	5.121270572687675E-8	0.0014705882352941176	0.0014705882352941176
33	—Rule-PPO—Complete-model-3 vs. MS	5.3744204900989665	7.682937577072956E-8	0.0015151515151515152	0.0015625
32	MS vs. —Flexible-PPO—Complete-model-1	4.920499840597358	8.632347051700941E-7	0.0015625	0.0015625
31	WINQ vs. —Flexible-PPO—Complete-model-3	4.757088406776777	1.9640516940510412E-6	0.0016129032258064516	0.0016129032258064516
30	MS vs. —Flexible-DDQN—MachineCompressed-model-7	4.521049669035947	6.153374683926467E-6	0.0016666666666666668	0.0016666666666666668
29	—Flexible-DDQN—MachineCompressed-model-7 vs. Random	4.46657919109577	7.948024959570024E-6	0.001724137931034483	0.001724137931034483
28	LWRK vs. MS	4.4484223651156976	8.650330368602841E-6	0.0017857142857142859	0.0017857142857142859
27	—Flexible-PPO—Complete-model-1 vs. Random	4.067129019534359	4.7595894311230106E-5	0.001851851851851852	0.001851851851851852
26	WINQ vs. —Flexible-PPO—Complete-model-1	3.921874411693828	8.786278732974598E-5	0.0019230769230769232	0.0019230769230769232
25	—Flexible-DDQN—MachineCompressed-model-7 vs. —Flexible-DDQN—Complete-model-0	3.6132083700327535	3.024314709831865E-4	0.002	0.002
24	WINQ vs. —Flexible-DDQN—MachineCompressed-model-7	3.5224242401324175	4.2761924220167437E-4	0.0020833333333333333	0.0020833333333333333
23	Random vs. —Flexible-PPO—Complete-model-3	3.23191502445141	0.0012296361657246463	0.002173913043478261	0.002173913043478261
22	—Flexible-PPO—Complete-model-1 vs. —Flexible-DDQN—Complete-model-0	3.213758198471343	0.001310099493384381	0.002272727272727273	0.002272727272727273
21	SPT vs. LWRK	3.17744546511209	0.0014857910042988878	0.002380952380952381	0.002380952380952381
20	—Rule-DDQN—MachineCompressed-model-4 vs. LWRK	3.17744546511209	0.0014857910042988878	0.0025	0.0025
19	—Rule-DDQN—Complete-model-1 vs. LWRK	2.8143080269099316	0.004888236438241243	0.002631578947368421	0.002631578947368421
18	—Flexible-DDQN—Complete-model-0 vs. —Flexible-PPO—Complete-model-3	2.3785442033883943	0.017381152846979477	0.0027777777777777778	0.0027777777777777778
17	SPT vs. —Rule-PPO—Complete-model-3	2.25144642152794	0.024357276756868735	0.0029411764705882353	0.0029411764705882353
16	—Rule-DDQN—MachineCompressed-model-4 vs. —Rule-PPO—Complete-model-3	2.25144642152794	0.024357276756868735	0.003125	0.003125
15	—Rule-DDQN—Complete-model-1 vs. —Rule-PPO—Complete-model-3	1.8883099019266627	0.05898435877453798	0.0033333333333333335	0.0033333333333333335
14	SPT vs. —Rule-PPO—MachineCompressed-model-6	1.6885848161459556	0.0912990224815342	0.0035714285714285718	0.0035714285714285718
13	—Rule-DDQN—MachineCompressed-model-4 vs. —Rule-PPO—MachineCompressed-model-6	1.6885848161459556	0.0912990224815342	0.0038461538461538464	0.0038461538461538464
12	—Rule-PPO—MachineCompressed-model-6 vs. LWRK	1.4888597303652535	0.13652430962615647	0.0041666666666666667	0.0041666666666666667
11	—Rule-DDQN—Complete-model-1 vs. —Rule-PPO—MachineCompressed-model-6	1.3254482965446779	0.1850225073299012	0.004545454545454546	0.004545454545454546
10	—Flexible-DDQN—MachineCompressed-model-7 vs. —Flexible-PPO—Complete-model-3	1.2346641666443596	0.2169555172461818	0.005	0.005
9	MS vs. WINQ	0.99862542890353	0.31797617698154673	0.005555555555555556	0.005555555555555556
8	LWRK vs. —Rule-PPO—Complete-model-3	0.9259981249832688	0.35444695467170445	0.00625	0.00625
7	—Flexible-DDQN—Complete-model-0 vs. Random	0.8533708210630158	0.39345369740304015	0.0071428571428571435	0.0071428571428571435
6	—Flexible-PPO—Complete-model-1 vs. —Flexible-PPO—Complete-model-3	0.8352139950829488	0.40359723126510594	0.0083333333333333333	0.0083333333333333333
5	—Rule-PPO—MachineCompressed-model-6 vs. —Rule-PPO—Complete-model-3	0.5628616053819847	0.5735291265356292	0.01	0.01
4	—Flexible-DDQN—MachineCompressed-model-7 vs. —Flexible-PPO—Complete-model-1	0.3994501715614107	0.6895615320875443	0.0125	0.0125
3	SPT vs. —Rule-DDQN—Complete-model-1	0.3631365196012777	0.7165029052613163	0.016666666666666666	0.016666666666666666
2	—Rule-DDQN—MachineCompressed-model-4 vs. —Rule-DDQN—Complete-model-1	0.3631365196012777	0.7165029052613163	0.025	0.025
1	SPT vs. —Rule-DDQN—MachineCompressed-model-4	0.0	1.0	0.05	0.05

Table 6: Holm / Shaffer Table for  $\alpha = 0.10$ 

$i$	algorithms	$z = (R_0 - R_i) / SE$	$p$	Holm	Shaffer
78	SPT vs. Random	16.613495771758622	5.565335860204697E-62	0.001282051282051282	0.001282051282051282
77	—Rule-DDQN—MachineCompressed-model-4 vs. Random	16.613495771758622	5.565335860204697E-62	0.0012987012987012987	0.0015151515151515152
76	—Rule-DDQN—Complete-model-1 vs. Random	16.250359252157345	2.220593690700706E-59	0.0013157894736842105	0.0015151515151515152
75	SPT vs. —Flexible-DDQN—Complete-model-0	15.760124950695607	5.851717967265271E-56	0.0013333333333333335	0.0015151515151515152
74	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-DDQN—Complete-model-0	15.760124950695607	5.851717967265271E-56	0.0013513513513513514	0.0015151515151515152
73	—Rule-DDQN—Complete-model-1 vs. —Flexible-DDQN—Complete-model-0	15.39698843109433	1.7147128644077812E-53	0.0013698630136986301	0.0015151515151515152
72	—Rule-PPO—MachineCompressed-model-6 vs. Random	14.924910955612667	2.2693832801735977E-50	0.0013888888888888889	0.0015151515151515152
71	—Rule-PPO—Complete-model-3 vs. Random	14.362049350230684	8.953972890580004E-47	0.0014084507042253522	0.0015151515151515152
70	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-DDQN—Complete-model-0	14.071540134549652	5.681836797615628E-45	0.0014285714285714286	0.0015151515151515152
69	—Rule-PPO—Complete-model-3 vs. —Flexible-DDQN—Complete-model-0	13.508678529167668	1.389939921182868E-41	0.0014492753623188406	0.0015151515151515152
68	LWRK vs. Random	13.436051225247414	3.7175136888723676E-41	0.0014705882352941176	0.0015151515151515152
67	SPT vs. —Flexible-PPO—Complete-model-3	13.381580747307215	7.748180258873034E-41	0.0014925373134328358	0.0015151515151515152
66	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-PPO—Complete-model-3	13.381580747307215	7.748180258873034E-41	0.0015151515151515152	0.0015151515151515152
65	—Rule-DDQN—Complete-model-1 vs. —Flexible-PPO—Complete-model-3	13.018444227705935	9.610913539771142E-39	0.0015384615384615385	0.0017857142857142859
64	LWRK vs. —Flexible-DDQN—Complete-model-0	12.5826804041844	2.6295381235957894E-36	0.0015625	0.0017857142857142859
63	SPT vs. —Flexible-PPO—Complete-model-1	12.546366752224266	4.161712370256904E-36	0.0015873015873015873	0.0017857142857142859
62	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-PPO—Complete-model-1	12.546366752224266	4.161712370256904E-36	0.0016129032258064516	0.0017857142857142859
61	—Rule-DDQN—Complete-model-1 vs. —Flexible-PPO—Complete-model-1	12.183230232622988	3.8185266798172176E-34	0.00163934426295082	0.0017857142857142859
60	SPT vs. —Flexible-DDQN—MachineCompressed-model-7	12.146916580662854	5.9570115516192054E-34	0.0016666666666666668	0.0017857142857142859
59	—Rule-DDQN—MachineCompressed-model-4 vs. —Flexible-DDQN—MachineCompressed-model-7	12.146916580662854	5.9570115516192054E-34	0.0016949152542372883	0.0017857142857142859
58	—Rule-DDQN—Complete-model-1 vs. —Flexible-DDQN—MachineCompressed-model-7	11.783780061061575	4.732222614314352E-32	0.001724137931034483	0.0017857142857142859
57	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-PPO—Complete-model-3	11.692995931161258	1.3841619081506487E-31	0.0017543859649122807	0.0017857142857142859
56	—Rule-PPO—Complete-model-3 vs. —Flexible-PPO—Complete-model-3	11.130134325779274	8.950053289856703E-29	0.0017857142857142859	0.0017857142857142859
55	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-PPO—Complete-model-1	10.85778193607831	1.831435730711343E-27	0.0018181818181818182	0.0018181818181818182
54	—Rule-PPO—MachineCompressed-model-6 vs. —Flexible-DDQN—MachineCompressed-model-7	10.483331764516897	1.341975476775118E-25	0.001851851851851852	0.0020833333333333333
53	—Rule-PPO—Complete-model-3 vs. —Flexible-PPO—Complete-model-1	10.294920330696325	7.428103980850365E-25	0.0018867924528301887	0.0020833333333333333
52	LWRK vs. —Flexible-PPO—Complete-model-3	10.204136200796006	1.9000427416378966E-24	0.0019230769230769232	0.0020833333333333333
51	—Rule-PPO—Complete-model-3 vs. —Flexible-DDQN—MachineCompressed-model-7	9.895470159134915	4.3555894244377864E-23	0.00196078431372549	0.0020833333333333333
50	LWRK vs. —Flexible-PPO—Complete-model-1	9.368922205713057	7.327694413458179E-21	0.002	0.0020833333333333333
49	MS vs. Random	8.987628860131718	2.5262146613034804E-19	0.0020408163265306124	0.0020833333333333333
48	LWRK vs. —Flexible-DDQN—MachineCompressed-model-7	8.969472034151645	2.979390976255843E-19	0.0020833333333333333	0.0020833333333333333
47	SPT vs. WINQ	8.624492340530438	6.437758837554842E-18	0.002127659574468085	0.002173913043478261
46	—Rule-DDQN—Complete-model-1 vs. WINQ	8.624492340530438	6.437758837554842E-18	0.002173913043478261	0.002173913043478261
45	MS vs. —Flexible-DDQN—Complete-model-0	8.26135582092916	1.4402704338719356E-16	0.0022222222222222222	0.0022222222222222222
44	WINQ vs. Random	8.134258039608701	4.1446888687625874E-16	0.0022727272727272723	0.0022222222222222222
43	SPT vs. MS	7.9890033431228187	1.3603390829715145E-15	0.002325581395348837	0.002380952380952381
42	—Rule-DDQN—MachineCompressed-model-4 vs. MS	7.625866911626907	2.423998126974424E-14	0.002380952380952381	0.002380952380952381
41	—Rule-DDQN—Complete-model-1 vs. MS	7.625866911626907	2.423998126974424E-14	0.0024390243902439024	0.002564102564102564
40	WINQ vs. —Flexible-DDQN—Complete-model-0	7.262730392025628	3.7935359377584177E-13	0.0025	0.002564102564102564
39	—Rule-PPO—MachineCompressed-model-6 vs. WINQ	7.135632610165171	9.634302348721324E-13	0.002564102564102564	0.002564102564102564
38	—Rule-PPO—Complete-model-3 vs. WINQ	6.935907524384481	4.036215764602311E-12	0.002631578947368421	0.002631578947368421
37	—Rule-PPO—MachineCompressed-model-6 vs. MS	6.373045919002497	1.8531037091929911E-10	0.0027027027027027023	0.0027027027027027023
36	MS vs. —Flexible-PPO—Complete-model-3	5.937282095480951	2.897858135388802E-9	0.0027777777777777778	0.0027777777777777778
35	LWRK vs. WINQ	5.755713835680307	8.627643188489504E-9	0.002857142857142857	0.0029411764705882353
34	—Rule-PPO—Complete-model-3 vs. MS	5.447047794019228	5.121270572687675E-8	0.0029411764705882353	0.0029411764705882353
33	MS vs. —Flexible-PPO—Complete-model-1	5.3744204900989665	7.682937577072956E-8	0.0030303030303030303	0.003125
32	WINQ vs. —Flexible-PPO—Complete-model-3	4.920499840597358	8.632347051700941E-7	0.003125	0.003125
31	MS vs. —Flexible-DDQN—MachineCompressed-model-7	4.757088406776777	1.9640516940510412E-6	0.0032258064516129032	0.0032258064516129032
30	—Flexible-DDQN—MachineCompressed-model-7 vs. Random	4.521049669035947	6.153374683926467E-6	0.0033333333333333335	0.0033333333333333335
29	LWRK vs. MS	4.46657919109577	7.948024959570024E-6	0.003448275862068966	0.003448275862068966
28	—Flexible-PPO—Complete-model-1 vs. Random	4.4484223651156976	8.650330368602841E-6	0.0035714285714285718	0.0035714285714285718
27	WINQ vs. —Flexible-PPO—Complete-model-1	4.067129019534359	4.7595894311230106E-5	0.0037037037037037034	0.0037037037037037034
26	—Flexible-DDQN—MachineCompressed-model-7 vs. —Flexible-DDQN—Complete-model-0	3.921874411693828	8.786278732974598E-5	0.0038461538461538464	0.0038461538461538464
25	WINQ vs. —Flexible-DDQN—MachineCompressed-model-7	3.6132083700327535	3.024314709831865E-4	0.004	0.004
24	Random vs. —Flexible-PPO—Complete-model-3	3.5224242401324175	4.2761924220167437E-4	0.0041666666666666667	0.0041666666666666667
23	—Flexible-PPO—Complete-model-1 vs. —Flexible-DDQN—Complete-model-0	3.23191502445141	0.0012296361657246463	0.004347826086956522	0.004347826086956522
22	SPT vs. LWRK	3.213758198471343	0.001310099493384381	0.004545454545454546	0.004545454545454546
21	—Rule-DDQN—MachineCompressed-model-4 vs. LWRK	3.17744546511209	0.0014857910042988878	0.004761904761904762	0.004761904761904762
20	—Rule-DDQN—Complete-model-1 vs. LWRK	3.17744546511209	0.0014857910042988878	0.005	0.005
19	—Flexible-DDQN—Complete-model-0 vs. —Flexible-PPO—Complete-model-3	2.8143080269099316	0.004888236438241243	0.005263157894736842	0.005263157894736842
18	SPT vs. —Rule-PPO—Complete-model-3	2.3785442033883943	0.017381152846979477	0.005555555555555556	0.005555555555555556
17	—Rule-DDQN—MachineCompressed-model-4 vs. —Rule-PPO—Complete-model-3	2.25144642152794	0.024357276756868735	0.0058823529411764705	0.0058823529411764705
16	—Rule-DDQN—Complete-model-1 vs. —Rule-PPO—Complete-model-3	2.25144642152794	0.024357276756868735	0.00625	0.00625
15	SPT vs. —Rule-PPO—MachineCompressed-model-6	1.8883099019266627	0.05898435877453798	0.006666666666666667	0.006666666666666667
14	—Rule-DDQN—MachineCompressed-model-4 vs. —Rule-PPO—MachineCompressed-model-6	1.6885848161459556	0.0912990224815342	0.0071428571428571435	0.0071428571428571435
13	—Rule-PPO—MachineCompressed-model-6 vs. LWRK	1.6885848161459556	0.0912990224815342	0.007692307692307693	0.007692307692307693
12	—Rule-DDQN—Complete-model-1 vs. —Rule-PPO—MachineCompressed-model-6	1.4888597303652535	0.13652430962615647	0.0083333333333333333	0.0083333333333333333
11	—Flexible-DDQN—MachineCompressed-model-7 vs. —Flexible-PPO—Complete-model-3	1.3254482965446779	0.1850225073299012	0.009090909090909092	0.009090909090909092
10	MS vs. WINQ	1.2346641666443596	0.2169555172461818	0.01	0.01
9	LWRK vs. —Rule-PPO—Complete-model-3	0.99862542890353	0.31797617698154673	0.011111111111111112	0.011111111111111112
8	—Flexible-DDQN—Complete-model-0 vs. Random	0.9259981249832688	0.35444695467170445	0.0125	0.0125
7	—Flexible-PPO—Complete-model-1 vs. —Flexible-PPO—Complete-model-3	0.8533708210630158	0.39345369740304015	0.014285714285714287	0.014285714285714287
6	—Rule-PPO—MachineCompressed-model-6 vs. —Rule-PPO—Complete-model-3	0.8352139950829488	0.40359723126510594	0.016666666666666666	0.016666666666666666
5	—Flexible-DDQN—MachineCompressed-model-7 vs. —Flexible-PPO—Complete-model-1	0.5628616053819847	0.5735291265356292	0.02	0.02
4	SPT vs. —Rule-DDQN—Complete-model-1	0.3994501715614107	0.6895615320875443	0.025	0.025
3	—Rule-DDQN—MachineCompressed-model-4 vs. —Rule-DDQN—Complete-model-1	0.3631365196012777	0.7165029052613163	0.033333333333333333	0.033333333333333333
2	SPT vs. —Rule-DDQN—MachineCompressed-model-4	0.3631365196012777	0.7165029052613163	0.05	0.05
1		0.0	1.0	0.1	0.1

Table 7: Adjusted  $p$ -values

i	hypothesis	unadjusted $p$	$P_{Neme}$	$P_{Holm}$	$P_{Shaf}$	$P_{Berg}$
1	SPT vs .Random	5.565335860204697E-62	4.3409619709596637E-60	4.3409619709596637E-60	4.3409619709596637E-60	0.0
2	—Rule-DDQN—MachineCompressed-model-4 vs .Random	5.565335860204697E-62	4.3409619709596637E-60	4.3409619709596637E-60	4.3409619709596637E-60	0.0
3	—Rule-DDQN—Complete-model-1 vs .Random	2.220593690700706E-59	1.732063078746551E-57	1.6876512049325367E-57	1.4655918358624662E-57	0.0
4	SPT vs .—Flexible-DDQN—Complete-model-0	5.851717967265271E-56	4.5643400144669116E-54	4.388788475448953E-54	3.862133858395079E-54	0.0
5	—Rule-DDQN—MachineCompressed-model-4 vs .—Flexible-DDQN—Complete-model-0	5.851717967265271E-56	4.5643400144669116E-54	4.388788475448953E-54	3.862133858395079E-54	0.0
6	—Rule-DDQN—Complete-model-1 vs .—Flexible-DDQN—Complete-model-0	1.7147128644077812E-53	1.3374760342380695E-51	1.2517403910176803E-51	1.1317104905091355E-51	0.0
7	—Rule-PPO—MachineCompressed-model-6 vs .Random	2.2693832801735977E-50	1.7701189585354063E-48	1.6339559617249902E-48	1.4977929649145744E-48	0.0
8	—Rule-PPO—Complete-model-3 vs .Random	8.953972890580004E-47	6.984098854652404E-45	6.357320752311803E-45	5.909622107782802E-45	0.0
9	—Rule-PPO—MachineCompressed-model-6 vs .—Flexible-DDQN—Complete-model-0	5.681836797615628E-45	4.43183270214019E-43	3.97728575833094E-43	3.750012286426315E-43	0.0
10	—Rule-PPO—Complete-model-3 vs .—Flexible-DDQN—Complete-model-0	1.389939921182868E-41	1.084153138522637E-39	9.590585456161789E-40	9.173603479806928E-40	0.0
11	LWRK vs .Random	3.7175136888723676E-41	2.8996606773204466E-39	2.52790930843321E-39	2.4535590346557626E-39	0.0
12	SPT vs .—Flexible-PPO—Complete-model-3	7.748180258873034E-41	6.043580601920967E-39	5.191280773444933E-39	5.1137989708562026E-39	0.0
13	—Rule-DDQN—MachineCompressed-model-4 vs .—Flexible-PPO—Complete-model-3	7.748180258873034E-41	6.043580601920967E-39	5.191280773444933E-39	5.1137989708562026E-39	0.0
14	—Rule-DDQN—Complete-model-1 vs .—Flexible-PPO—Complete-model-3	9.610913539771142E-39	7.4965125610214905E-37	6.247093800851242E-37	5.3821115822718396E-37	0.0
15	LWRK vs .—Flexible-DDQN—Complete-model-0	2.6295381235957894E-36	2.0510397364047158E-34	1.6829043991013052E-34	1.472541349213642E-34	0.0
16	SPT vs .—Flexible-PPO—Complete-model-1	4.161712370256904E-36	3.246135648800385E-34	2.6218787932618495E-34	2.330558927343866E-34	0.0
17	—Rule-DDQN—MachineCompressed-model-4 vs .—Flexible-PPO—Complete-model-1	4.161712370256904E-36	3.246135648800385E-34	2.6218787932618495E-34	2.330558927343866E-34	0.0
18	—Rule-DDQN—Complete-model-1 vs .—Flexible-PPO—Complete-model-1	3.8185266798172176E-34	2.9784508102574297E-32	2.3293012746885027E-32	2.138374940676419E-32	0.0
19	SPT vs .—Flexible-DDQN—MachineCompressed-model-7	5.9570115516192054E-34	4.64646901026298E-32	3.574206930971523E-32	3.335926468906755E-32	0.0
20	—Rule-DDQN—MachineCompressed-model-4 vs .—Flexible-DDQN—MachineCompressed-model-7	5.9570115516192054E-34	4.64646901026298E-32	3.574206930971523E-32	3.335926468906755E-32	0.0
21	—Rule-DDQN—Complete-model-1 vs .—Flexible-DDQN—MachineCompressed-model-7	4.732222614314352E-32	3.6911336391651946E-30	2.744689116302324E-30	2.650044664016037E-30	0.0
22	—Rule-PPO—MachineCompressed-model-6 vs .—Flexible-PPO—Complete-model-3	1.3841619081506487E-31	1.0796462883575061E-29	7.889722876458698E-30	7.751306685646333E-30	0.0
23	—Rule-PPO—Complete-model-3 vs .—Flexible-PPO—Complete-model-3	8.950053289856703E-29	6.981041566088229E-27	5.012029842319754E-27	5.012029842319754E-27	0.0
24	—Rule-PPO—MachineCompressed-model-6 vs .—Flexible-PPO—Complete-model-1	1.831435730711343E-27	1.4285198699548475E-25	1.0072896518912387E-25	1.0072896518912387E-25	0.0
25	—Rule-PPO—MachineCompressed-model-6 vs .—Flexible-DDQN—MachineCompressed-model-7	1.341975476775118E-25	1.0467408718845921E-23	7.246667574585637E-24	6.441482288520566E-24	0.0
26	—Rule-PPO—Complete-model-3 vs .—Flexible-PPO—Complete-model-1	7.428103980850365E-25	5.793921105063285E-23	3.9368951098506934E-23	3.565489910808175E-23	0.0
27	LWRK vs .—Flexible-PPO—Complete-model-3	1.9000427416378966E-24	1.482033384775594E-22	9.880222256517062E-23	9.120205159861904E-23	0.0
28	—Rule-PPO—Complete-model-3 vs .—Flexible-DDQN—MachineCompressed-model-7	4.3555894244377864E-23	3.3973597510614734E-21	2.221350606463271E-21	2.0906829237301376E-21	0.0
29	LWRK vs .—Flexible-PPO—Complete-model-1	7.327694413458179E-21	5.71560164249738E-19	3.6638472067290896E-19	3.517293318459926E-19	0.0
30	MS vs .Random	2.5262146613034804E-19	1.9704474358167148E-17	1.2378451840387055E-17	1.2125830374256706E-17	0.0
31	LWRK vs .—Flexible-DDQN—MachineCompressed-model-7	2.979390976255843E-19	2.3239249614795577E-17	1.4301076686028046E-17	1.4301076686028046E-17	0.0
32	SPT vs .WINQ	6.437758837554842E-18	5.021451893292777E-16	3.025746653650776E-16	2.9613690652752273E-16	0.0
33	—Rule-DDQN—MachineCompressed-model-4 vs .WINQ	6.437758837554842E-18	5.021451893292777E-16	3.025746653650776E-16	2.9613690652752273E-16	0.0
34	—Rule-DDQN—Complete-model-1 vs .WINQ	1.4402704338719356E-16	1.1234109384201098E-14	6.48121695242371E-15	6.48121695242371E-15	0.0
35	MS vs .—Flexible-DDQN—Complete-model-0	4.1446888687625874E-16	3.23266317634818E-14	1.8236631022555383E-14	1.7407693248802868E-14	0.0
36	WINQ vs .Random	1.3603390829715415E-15	1.0610644847178024E-13	5.849458056777628E-14	5.713424144840475E-14	0.0
37	SPT vs .MS	2.423998126974424E-14	1.8907185390400506E-12	1.018079213329258E-12	1.018079213329258E-12	0.0
38	—Rule-DDQN—MachineCompressed-model-4 vs .MS	2.423998126974424E-14	1.8907185390400506E-12	1.018079213329258E-12	1.018079213329258E-12	0.0
39	—Rule-DDQN—Complete-model-1 vs .MS	3.7935359377584177E-13	2.958958031451566E-11	1.5174143751033672E-11	1.479479015725783E-11	0.0
40	WINQ vs .—Flexible-DDQN—Complete-model-0	9.634302348721324E-13	7.514755832002632E-11	3.757377916001316E-11	3.757377916001316E-11	0.0
41	—Rule-PPO—MachineCompressed-model-6 vs .WINQ	4.036215764602311E-12	3.1482482963898024E-10	1.533761990548878E-10	1.533761990548878E-10	0.0
42	—Rule-PPO—Complete-model-3 vs .WINQ	1.8531037091929911E-10	1.445420893170533E-8	6.856483724014067E-9	6.856483724014067E-9	0.0
43	—Rule-PPO—MachineCompressed-model-6 vs .MS	2.897858135388802E-9	2.2603293456032656E-7	1.0432289287399687E-7	1.0432289287399687E-7	0.0
44	MS vs .—Flexible-PPO—Complete-model-3	8.627643188489504E-9	6.729561687021813E-7	3.019675115971326E-7	2.933398684086431E-7	0.0
45	LWRK vs .WINQ	5.121270572687675E-8	3.994591046696386E-6	1.7412319947138095E-6	1.7412319947138095E-6	0.0
46	—Rule-PPO—Complete-model-3 vs .MS	7.682937577072950E-8	5.992691310116906E-6	2.5353694004340754E-6	2.458540024663340E-6	0.0
47	MS vs .—Flexible-PPO—Complete-model-1	8.632347051700941E-7	6.733230700326734E-5	2.7623510565443012E-5	2.7623510565443012E-5	0.0
48	WINQ vs .—Flexible-PPO—Complete-model-3	1.9640516940510412E-6	1.5319603213598121E-4	6.088560251558228E-5	6.088560251558228E-5	0.0
49	MS vs .—Flexible-DDQN—MachineCompressed-model-7	6.153374683926467E-6	4.799632253462644E-4	1.84601240517794E-4	1.84601240517794E-4	0.0
50	—Flexible-DDQN—MachineCompressed-model-7 vs .Random	7.948024959570024E-6	6.199459468464619E-4	2.3049272382753068E-4	2.3049272382753068E-4	0.0
51	LWRK vs .MS	8.650330368602841E-6	6.747257687510217E-4	2.4220925032087954E-4	2.4220925032087954E-4	0.0
52	—Flexible-PPO—Complete-model-1 vs .Random	4.7595894311230106E-5	0.0037124797562759484	0.0012850891464032128	0.0012850891464032128	0.0
53	WINQ vs .—Flexible-PPO—Complete-model-1	8.786278732974598E-5	0.006853297411720186	0.0022844324705733952	0.0022844324705733952	0.0
54	—Flexible-DDQN—MachineCompressed-model-7 vs .—Flexible-DDQN—Complete-model-0	3.024314709831865E-4	0.02358965473668855	0.0075607867745796625	0.0075607867745796625	0.0
55	WINQ vs .—Flexible-DDQN—MachineCompressed-model-7	4.2761924220167437E-4	0.0333543008917306	0.010262861812840186	0.010262861812840186	0.0
56	Random vs .—Flexible-PPO—Complete-model-3	0.0012296361657246463	0.09591162092652242	0.028281631811666867	0.028281631811666867	0.0
57	—Flexible-PPO—Complete-model-1 vs .—Flexible-DDQN—Complete-model-0	0.001310099493384381	0.10218776048398172	0.028822188854456383	0.028822188854456383	0.0
58	SPT vs .LWRK	0.0014857910042988878	0.11589169833531325	0.031201611090276644	0.031201611090276644	0.0
59	—Rule-DDQN—MachineCompressed-model-4 vs .LWRK	0.0014857910042988878	0.11589169833531325	0.031201611090276644	0.031201611090276644	0.0
60	—Rule-DDQN—Complete-model-1 vs .LWRK	0.0048882263438241243	0.3812824421828169	0.09287649232658361	0.09287649232658361	0.0
61	—Flexible-DDQN—Complete-model-0 vs .—Flexible-PPO—Complete-model-3	0.017381152846979477	1.3557299220643992	0.31286075124563056	0.31286075124563056	0.0
62	SPT vs .—Rule-PPO—Complete-model-3	0.024357276756868735	1.8998675870357613	0.4140737048667685	0.4140737048667685	0.0
63	—Rule-DDQN—MachineCompressed-model-4 vs .—Rule-PPO—Complete-model-3	0.024357276756868735	1.8998675870357613	0.4140737048667685	0.4140737048667685	0.0
64	—Rule-DDQN—Complete-model-1 vs .—Rule-PPO—Complete-model-3	0.05898435877453798	4.600779984413963	0.8847653816180697	0.8847653816180697	0.0
65	SPT vs .—Rule-PPO—MachineCompressed-model-6	0.0912990232815342	7.121323753559667	1.2781863147414787	1.2781863147414787	0.0
66	—Rule-DDQN—MachineCompressed-model-4 vs .—Rule-PPO—MachineCompressed-model-6	0.0912990224815342	7.121323753559667	1.2781863147414787	1.2781863147414787	0.0
67	—Rule-PPO—MachineCompressed-model-6 vs .LWRK	0.13652430962615647	10.648896150840205	1.6382917155138776	1.6382917155138776	0.0
68	—Rule-DDQN—Complete-model-1 vs .—Rule-PPO—MachineCompressed-model-6	0.1850225073299012	14.431755571732293	2.035247580628913	2.035247580628913	0.0
69	—Flexible-DDQN—MachineCompressed-model-7 vs .—Flexible-PPO—Complete-model-3	0.2169555172461818	16.92253034520218	2.169555172461818	2.169555172461818	0.0
70	MS vs .WINQ	0.31797617698154673	24.802141804560645	2.8617855928339204	2.8617855928339204	0.0
71	LWRK vs .—Rule-PPO—Complete-model-3	0.35444695467170445	27.646862464392946	2.8617855928339204	2.8617855928339204	0.0
72	—Flexible-DDQN—Complete-model-0 vs .Random	0.39345369740304015	30.68938839743713	2.8617855928339204	2.8617855928339204	0.0
73	—Flexible-PPO—Complete-model-1 vs .—Flexible-PPO—Complete-model-3	0.40359723126510594	31.480584038678263	2.8617855928339204	2.8617855928339204	0.0
74	—Rule-PPO—MachineCompressed-model-6 vs .—Rule-PPO—Complete-model-3	0.5735291265356292	44.735271869779076	2.867645632678146	2.867645632678146	0.0
75	—Flexible-DDQN—MachineCompressed-model-7 vs .—Flexible-PPO—Complete-model-1	0.6895615320875443	53.78579950282846	2.867645632678146	2.867645632678146	0.0
76	SPT vs .—Rule-DDQN—Complete-model-1	0.7165029052613163	55.887226610382676	2.867645632678146	2.867645632678146	0.0
77	—Rule-DDQN—MachineCompressed-model-4 vs .—Rule-DDQN—Complete-model-1	0.7165029052613163	55.887226610382676	2.867645632678146	2.867645632678146	0.0
78	SPT vs .—Rule-DDQN—MachineCompressed-model-4	1.0	78.0	2.867645632678146	2.867645632678146	0.0