

May 9, 2011

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

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Table 1: Average Rankings of the algorithms (Friedman)

Algorithm	Ranking
C45Rules $_G M_t st$	4.702380952380951
OCEC $_G M_t st$	2.1428571428571423
Ripper $_G M_t st$	3.833333333333333
Gassist $_G M_t st$	6.761904761904764
REGAL $_G M_t st$	5.678571428571431
UCS $_G M_t st$	6.404761904761905
REGALTC $_G M_t st$	3.8571428571428563
SIA $_G M_t st$	6.392857142857145
Oblique-DT $_G M_t st$	5.226190476190474

Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 103.311111111111133. P-value computed by Friedman

Test: 4.968880862321612E-11.

Iman and Davenport statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 18.20351446853219. P-value computed by Iman and Davenport Test: 1.5669130946774203E-22.

Table 2: Average Rankings of the algorithms (Aligned Friedman)

Algorithm	Ranking
C45Rules $_G M_t st$	183.6071428571428
OCEC $_G M_t st$	90.99999999999999
Ripper $_G M_t st$	132.83333333333331
GAssist $_G M_t st$	244.71428571428567
REGAL $_G M_t st$	227.98809523809524
UCS $_G M_t st$	231.69047619047618
REGALTC $_G M_t st$	145.35714285714286
SIA $_G M_t st$	248.7738095238095
Oblique-DT $_G M_t st$	199.5357142857143

Aligned Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 37.694664696909705. P-value computed by

Aligned Friedman Test: 8.571751006325457E-6.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
C45Rules $_G M_t st$	4.2275747508305646
OCEC $_G M_t st$	1.914728682170542
Ripper $_G M_t st$	3.810631229235881
GAssist $_G M_t st$	6.691029900332226
REGAL $_G M_t st$	6.093023255813954
UCS $_G M_t st$	6.27906976744186
REGALTC $_G M_t st$	4.1096345514950166
SIA $_G M_t st$	6.643410852713178
Oblique-DT $_G M_t st$	5.230897009966778

Quade statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 14.604175185525804. P-value computed by Quade Test: 2.8943445367918247E-18.

Table 4: Contrast Estimation

	C45Rules $M_{f, st}$	OCEC $M_{f, st}$	Ripper $M_{f, st}$	GAssist $M_{f, st}$	REGAL $M_{f, st}$	UCS $M_{f, st}$	REGALTC $M_{f, st}$	SIA $M_{f, st}$	Oblique-DT $M_{f, st}$
C45Rules $M_{f, st}$	0.00000000	-0.04977556	-0.02194333	0.04871333	0.02920667	0.03332111	-0.01226056	0.05502278	0.01337056
OCEC $M_{f, st}$	0.04977556	0.00000000	0.02783222	0.09848889	0.07898222	0.08309667	0.03751500	0.10479833	0.06314611
Ripper $M_{f, st}$	0.02194333	-0.02783222	0.00000000	0.07065667	0.05115000	0.05526444	0.00968278	0.07696611	0.03531389
GAssist $M_{f, st}$	-0.04871333	-0.09848889	-0.07065667	0.00000000	-0.01950667	-0.01539222	-0.06097389	0.00630944	-0.03534278
REGAL $M_{f, st}$	0.02920667	-0.07898222	-0.05115000	0.01950667	0.00000000	0.00411444	-0.04146722	0.02581611	-0.01583611
UCS $M_{f, st}$	-0.03332111	-0.08309667	-0.05526444	0.01539222	-0.00411444	0.00000000	-0.04558167	0.02170167	-0.01995056
REGALTC $M_{f, st}$	0.01226056	-0.03751500	-0.00968278	0.06097389	0.04146722	0.04558167	0.00000000	0.06728333	0.02563111
SIA $M_{f, st}$	-0.05502278	-0.10479833	-0.07696611	-0.00630944	-0.02581611	-0.02170167	-0.06728333	0.00000000	-0.04165222
Oblique-DT $M_{f, st}$	-0.01337056	-0.06314611	-0.03531389	0.03534278	0.01583611	0.01995056	-0.02563111	0.04165222	0.00000000

Table 5: Holm / Hochberg / Holland / Rom / Finner / Li Table for $\alpha = 0.05$ (FRIEDMAN)

i	algorithm	$z = (R_0 - R_i) / SE$	p	Holm/Hochberg/Hommel	Holland	Rom	Finner	Li
8	GAssist $_G M_t st$	7.729145007029083	1.0827128750768408E-14	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.052385598093
7	UCS $_G M_t st$	7.131530702361884	9.925880592787218E-13	0.0071428571428571435	0.0073008331979014655	0.0075128293213784685	0.012741455098566168	0.052385598093
6	SIA $_G M_t st$	7.111610225539647	1.1469680288237233E-12	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.052385598093
5	REGAL $_G M_t st$	5.916381616205253	3.2910114780932877E-9	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.052385598093
4	Oblique-DT $_G M_t st$	5.159403496960129	2.4773787776822595E-7	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.052385598093
3	C45Rules $_G M_t st$	4.282902516781576	1.8447100522122413E-5	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.052385598093
2	REGALTC $_G M_t st$	2.8685486624025445	0.004123597601309989	0.025	0.025320565519103666	0.025	0.04388935252272508	0.052385598093
1	Ripper $_G M_t st$	2.8287077087580657	0.004673636218778544	0.05	0.0500000000000000044	0.05	0.0500000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.00625 .

Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.05 .

Hommel's procedure rejects all hypotheses.

Rom's procedure rejects those hypotheses that have a p-value ≤ 0.05 .

Li's procedure rejects those hypotheses that have a p-value ≤ 0.05 .

Table 6: Holm / Hochberg / Holland / Rom / Finner / Li Table for $\alpha = 0.05$ (ALIGNED FRIEDMAN)

i	algorithm	$z = (R_0 - R_i)/SE$	p	Holm/Hochberg/Hommel	Holland	Rom	Finner	Li
8	SIA _G $M_t.st$	6.617130160397329	3.662390129663484E-11	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.048455673817
7	GAssist _G $M_t.st$	6.446871246589473	1.1418270773389638E-10	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.048455673817
6	UCS _G $M_t.st$	5.9006447019977095	3.620838938662544E-9	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.048455673817
5	REGAL _G $M_t.st$	5.745364578260927	9.172314100169283E-9	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.048455673817
4	Oblique-DT _G $M_t.st$	4.552054302598843	5.312461849729645E-6	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.048455673817
3	C45Rules _G $M_t.st$	3.88400026542902	1.0275179486350505E-4	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.048455673817
2	REGALTC _G $M_t.st$	2.2797718488171896	0.022621223454244298	0.025	0.025320565519103666	0.025	0.04388935252272508	0.048455673817
1	Ripper _G $M_t.st$	1.7545156103249235	0.07934219746463843	0.05	0.050000000000000044	0.05	0.050000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.00625 .

Holm's procedure rejects those hypotheses that have a p-value ≤ 0.05 .

Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.025 .

Hommel's procedure rejects those hypotheses that have a p-value ≤ 0.05 .

Holland's procedure rejects those hypotheses that have a p-value $\leq 0.050000000000000044$.

Rom's procedure rejects those hypotheses that have a p-value ≤ 0.025 .

Finner's procedure rejects those hypotheses that have a p-value $\leq 0.050000000000000044$.

Li's procedure rejects those hypotheses that have a p-value ≤ 0.04845567381765062 .

Table 7: Holm / Hochberg / Holland / Rom / Finner / Li Table for $\alpha = 0.05$ (QUADE)

i	algorithm	$z = (R_0 - R_i) / SE$	p	Holm/Hochberg/Hommel	Holland	Rom	Finner	Li
8	GAssist $_G M_t st$	3.4810569011970176	4.994393786738658E-4	0.00625	0.0063911150954545011	0.006574125233361166	0.006391150954545011	0.0438398599760
7	SIA $_G M_t st$	3.4463512562279757	5.682112715114459E-4	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0438398599760
6	UC $_G M_t st$	3.18081271681369	0.0014686253857334026	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0438398599760
5	REGAL $_G M_t st$	3.045218569027671	0.002325112699013033	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0438398599760
4	Oblique-DT $_G M_t st$	2.4168849734835316	0.01565396305908794	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0438398599760
3	C45Rules $_G M_t st$	1.6856451050660726	0.09186417602376848	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0438398599760
2	REGALTC $_G M_t st$	1.599688100666007	0.109667792934609	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0438398599760
1	Ripper $_G M_t st$	1.3817689345813344	0.16704266045586882	0.05	0.050000000000000044	0.05	0.050000000000000044	0.0438398599760

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.00625 .

Holm's procedure rejects those hypotheses that have a p-value ≤ 0.0125 .

Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.01 .

Hommel's procedure rejects those hypotheses that have a p-value ≤ 0.0125 .

Holland's procedure rejects those hypotheses that have a p-value $\leq 0.012741455098566168$.

Rom's procedure rejects those hypotheses that have a p-value $\leq 0.010515350115740741$.

Finner's procedure rejects those hypotheses that have a p-value ≤ 0.03773939976903784 .

Li's procedure rejects those hypotheses that have a p-value ≤ 0.04383985997600691 .

Table 8: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	GAssist $_G M_t, st$	1.0827128750768408E-14	8.661703000614726E-14	8.661703000614726E-14	8.661703000614726E-14	8.661703000614726E-14
2	UCS $_G M_t, st$	9.925880592787218E-13	7.940704474229775E-12	6.948116414951053E-12	6.8818081729423405E-12	5.955528355672331E-12
3	SIA $_G M_t, st$	1.1469680288237233E-12	9.175744230589787E-12	6.948116414951053E-12	6.8818081729423405E-12	6.8818081729423405E-12
4	REGAL $_G M_t, st$	3.2910114780932877E-9	2.63280918247463E-8	1.6455057390466438E-8	1.6455057390466438E-8	1.6455057390466438E-8
5	Oblique-DT $_G M_t, st$	2.477378776822595E-7	1.9819030221458076E-6	9.909515110729038E-7	9.909515110729038E-7	9.909515110729038E-7
6	C45Rules $_G M_t, st$	1.8447100522122413E-5	1.475768041769793E-4	5.534130156636724E-5	5.534130156636724E-5	5.534130156636724E-5
7	REGALTC $_G M_t, st$	0.004123597601309989	0.032988780810479915	0.008247195202619979	0.004673636218778544	0.004673636218778544
8	Ripper $_G M_t, st$	0.004673636218778544	0.03738908975022835	0.008247195202619979	0.004673636218778544	0.004673636218778544

Table 9: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	GAssist $_G M_t, st$	1.0827128750768408E-14	8.704148513061227E-14	8.23465359595292E-14	8.704148513061227E-14	1.0877968417953165E-14
2	UCS $_G M_t, st$	9.925880592787218E-13	6.94777568810423E-12	6.543511808413799E-12	3.97015753605956E-12	9.972488375641064E-13
3	SIA $_G M_t, st$	1.1469680288237233E-12	6.94777568810423E-12	6.543511808413799E-12	3.97015753605956E-12	1.1523537108623318E-12
4	REGAL $_G M_t, st$	3.2910114780932877E-9	1.6455057205710943E-8	1.564860628447775E-8	6.58202926693298E-9	3.3064646802976257E-9
5	Oblique-DT $_G M_t, st$	2.477378776822595E-7	9.909511428096707E-7	9.448882107965709E-7	3.963805749185312E-7	2.489010892516181E-7
6	C45Rules $_G M_t, st$	1.8447100522122413E-5	5.534028068610031E-5	5.534130156636724E-5	2.4596058407988508E-5	1.85333768965759E-5
7	REGALTC $_G M_t, st$	0.004123597601309989	0.008230191145442434	0.004673636218778544	0.004711293248084392	0.004125866987483644
8	Ripper $_G M_t, st$	0.004673636218778544	0.008230191145442434	0.004673636218778544	0.004711293248084392	0.004673636218778544

Table 10: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hom}
1	SIA $_G M_t st$	3.662390129663484E-11	2.929912103730787E-10	2.929912103730787E-10	2.929912103730787E-10	2.929912103730787E-10
2	GAssist $_G M_t st$	1.1418270773389638E-10	9.134616618711711E-10	7.992789541372747E-10	7.992789541372747E-10	7.992789541372747E-10
3	UCS $_G M_t st$	3.620838938662544E-9	2.8966711509300352E-8	2.1725033631975264E-8	2.1725033631975264E-8	2.1725033631975264E-8
4	REGAL $_G M_t st$	9.172314100169283E-9	7.3378511280135426E-8	4.586157050084641E-8	4.586157050084641E-8	4.586157050084641E-8
5	Oblique-DT $_G M_t st$	5.312461849729643E-6	4.249969479783716E-5	2.124984739891858E-5	2.124984739891858E-5	2.124984739891858E-5
6	C45Rules $_G M_t st$	1.0275179486350505E-4	8.220143589080404E-4	3.0825538459051515E-4	3.0825538459051515E-4	3.0825538459051515E-4
7	REGALTC $_G M_t st$	0.022621223454244298	0.180996978763395438	0.045242446908488596	0.045242446908488596	0.045242446908488596
8	Ripper $_G M_t st$	0.07934219746463843	0.6347375797171074	0.07934219746463843	0.07934219746463843	0.07934219746463843

Table 11: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	SIA $_G M_t st$	3.662390129663484E-11	2.929914089122576E-10	2.785458140558578E-10	2.929914089122576E-10	3.978014545069937E-11
2	GAssist $_G M_t st$	1.1418270773389638E-10	7.992786432708954E-10	7.599181536640175E-10	4.567306532976545E-10	1.2402296206613582E-10
3	UCS $_G M_t st$	3.620838938662544E-9	2.1725033549913064E-8	2.0657073044835675E-8	9.65557056531452E-9	3.932882461269465E-9
4	REGAL $_G M_t st$	9.172314100169283E-9	4.586156976404965E-8	4.361392630397999E-8	1.8344628149868925E-8	9.96278311390861E-9
5	Oblique-DT $_G M_t st$	5.312461849729645E-6	2.124967806615974E-5	2.026207141732403E-5	8.499925412963627E-6	5.770255985269635E-6
6	C45Rules $_G M_t st$	1.0275179486350505E-4	3.08223711881328E-4	3.0825538459051515E-4	1.3700004689076728E-4	1.1159447956396028E-4
7	REGALTC $_G M_t st$	0.022621223454244298	0.04473072715792181	0.045242446908488596	0.02581078909339095	0.02398147613905874
8	Ripper $_G M_t st$	0.07934219746463843	0.07934219746463844	0.07934219746463843	0.07934219746463844	0.07934219746463843

Table 12: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	GAssist $_G M_t st$	4.994393786738658E-4	0.003995515029390926	0.003995515029390926	0.003977478900580121	0.0034960756507170605
2	SIA $_G M_t st$	5.682112715114459E-4	0.004545690172091567	0.003995515029390926	0.003977478900580121	0.003977478900580121
3	UCS $_G M_t st$	0.0014686253857334026	0.01174900308586722	0.008811752314400415	0.008811752314400415	0.007343126928667013
4	REGAL $_G M_t st$	0.002325112699013033	0.018600901592104264	0.011625563495065164	0.011625563495065164	0.011625563495065164
5	Oblique-DT $_G M_t st$	0.01565396305908794	0.12523170447270351	0.06261585223635176	0.06261585223635176	0.06261585223635176
6	C45Rules $_G M_t st$	0.09186417602376848	0.7349134081901478	0.2755925280713054	0.16704266045586882	0.16704266045586882
7	REGALTC $_G M_t st$	0.109667792934609	0.877342343476872	0.2755925280713054	0.16704266045586882	0.16704266045586882
8	Ripper $_G M_t st$	0.16704266045586882	1.3363412836469506	0.2755925280713054	0.16704266045586882	0.16704266045586882

Table 13: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Hol}	p_{Rom}	p_{Finn}	p_{Li}
1	GAssist $_G M_t st$	4.994393786738658E-4	0.003988537690114757	0.0037816064175353148	0.003988537690114757	5.992384863908149E-4
2	SIA $_G M_t st$	5.682112715114459E-4	0.003988537690114757	0.0037816064175353148	0.003988537690114757	6.816962850813935E-4
3	UCS $_G M_t st$	0.0014686253857334026	0.008779462689209039	0.00837858363283092	0.003988537690114757	0.0017600427688714646
4	REGAL $_G M_t st$	0.002325112699013033	0.011571627557428132	0.011055802581088112	0.004644819248962984	0.0027836245006332425
5	Oblique-DT $_G M_t st$	0.01565396305908794	0.0611608566309616	0.05970522263299333	0.024928471689947274	0.018446564417734585
6	C45Rules $_G M_t st$	0.09186417602376848	0.2510506918085077	0.16704266045586882	0.12057040360477911	0.09933178940734093
7	REGALTC $_G M_t st$	0.109667792934609	0.2510506918085077	0.16704266045586882	0.12432038719927996	0.11634295453827444
8	Ripper $_G M_t st$	0.16704266045586882	0.2510506918085077	0.16704266045586882	0.16704266045586882	0.16704266045586882