

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 $_G M_t st$	6.714285714285717
OCEC $_G M_t st$	5.285714285714285
Ripper $_G M_t st$	5.666666666666667
GAssist $_G M_t st$	5.9285714285714315
REGAL $_G M_t st$	6.261904761904763
UCS $_G M_t st$	1.642857142857142
REGALTC $_G M_t st$	6.166666666666666
SIA $_G M_t st$	4.261904761904763
Oblique-DT $_G M_t st$	3.07142857142857

Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 127.76507936507959. P-value computed by Friedman

Test: 6.800826568564844E-11.

Iman and Davenport statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 25.156050858310284. P-value computed by Iman and Davenport Test: 3.617835891193928E-30.

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

Algorithm	Ranking
C45Rules $_G M_t st$	273.61904761904765
OCEC $_G M_t st$	198.11904761904765
Ripper $_G M_t st$	217.80952380952385
GAssist $_G M_t st$	223.47619047619042
REGAL $_G M_t st$	233.97619047619045
UCS $_G M_t st$	57.97619047619048
REGALTC $_G M_t st$	235.26190476190476
SIA $_G M_t st$	166.33333333333331
Oblique-DT $_G M_t st$	98.92857142857139

Aligned Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 38.183468112679016. P-value computed by

Aligned Friedman Test: 6.962917260211476E-6.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
C45Rules $_G M_t st$	7.07641196013289
OCEC $_G M_t st$	5.409745293466224
Ripper $_G M_t st$	5.4318936877076425
GAssist $_G M_t st$	5.724252491694353
REGAL $_G M_t st$	5.878183831672203
UCS $_G M_t st$	1.5437430786267994
REGALTC $_G M_t st$	6.115171650055371
SIA $_G M_t st$	4.894795127353267
Oblique-DT $_G M_t st$	2.925802879291252

Quade statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 17.30115176129348. P-value computed by Quade Test: 1.752641249963453E-21.

Table 4: Contrast Estimation

C45Rules $G_{Mf, st}$	C45Rules $G_{Mf, st}$	OCBC $G_{Mf, st}$	Ripper $G_{Mf, st}$	GAssist $G_{Mf, st}$	REGAL $G_{Mf, st}$	UCS $G_{Mf, st}$	REGALTC $G_{Mf, st}$	SIA $G_{Mf, st}$	Oblique-DT $G_{Mf, st}$
0.00000000	0.00000000	-0.06381000	-0.04886056	-0.04234556	-0.03559056	-0.15690222	-0.03752667	-0.08141556	-0.12690389
0.06381000	0.00000000	0.00000000	0.01494944	0.02146444	0.02821944	-0.09309222	0.02628333	-0.01760556	-0.06309389
0.04886056	-0.01494944	-0.01494944	-0.00000000	0.00651500	0.01327000	-0.10804167	0.01133389	-0.03255500	-0.07804333
0.04234556	0.02146444	-0.02146444	0.00000000	0.00000000	0.00675500	-0.11455667	0.00481889	-0.03907000	-0.08455833
0.03559056	-0.02821944	-0.02821944	-0.01327000	-0.00675500	0.00000000	-0.12131167	-0.00193611	-0.04582500	-0.09131333
0.15690222	0.09309222	0.09309222	0.10804167	0.11455667	0.12131167	0.00000000	0.11637556	0.07548667	0.02999833
0.03752667	-0.02628333	-0.02628333	-0.01133389	-0.00481889	0.00193611	-0.11937556	0.00000000	-0.04388889	-0.08937722
0.08141556	0.01760556	0.01760556	0.03255500	0.03907000	0.04582500	-0.07548667	0.04388889	0.00000000	-0.04548833
0.12690389	0.06309389	0.06309389	0.07804333	0.08455833	0.09131333	-0.02999833	0.08637722	0.04548833	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	C45Rules $_G M_t st$	8.486123126274201	2.136450758146878E-17	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.051745925816
7	REGAL $_G M_t st$	7.729145007029081	1.0827128750768566E-14	0.0071428571428571435	0.0073008331979014655	0.0075128293213784685	0.012741455098566168	0.051745925816
6	REGALTC $_G M_t st$	7.56978119245116	3.738533859392836E-14	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.051745925816
5	GAssist $_G M_t st$	7.17137165600637	7.425002642801194E-13	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.051745925816
4	Ripper $_G M_t st$	6.733121165917088	1.6606166022401287E-11	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.051745925816
3	OCEC $_G M_t st$	6.095665907605408	1.0898281461810055E-9	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.051745925816
2	SIA $_G M_t st$	4.38250490089278	1.1732252595015243E-5	0.025	0.025320565519103666	0.025	0.04388935252272508	0.051745925816
1	Oblique-DTC $_G M_t st$	2.3904572186687862	0.016827409482756867	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	C45Rules $G M_t st$	9.044193444913395	1.5077409853252038E-19	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0481118181888
7	REGALTC $G M_t st$	7.43547139128024	1.0419571629228546E-13	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0481118181888
6	REGAL $G M_t st$	7.381547747024379	1.5645988259892123E-13	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.0481118181888
5	GAssist $G M_t st$	6.941171318934855	3.888620813974253E-12	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0481118181888
4	Ripper $G M_t st$	6.70350784980718	2.0347475990756702E-11	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0481118181888
3	OCEC $G M_t st$	5.877677223888733	4.160631794493359E-9	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0481118181888
2	SIA $G M_t st$	4.544564907563305	5.504884279226894E-6	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0481118181888
1	Oblique-DT $G M_t st$	1.7175679281496103	0.08587545442441995	0.05	0.050000000000000044	0.05	0.050000000000000044	0.0481118181888

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 ≤ 0.04811181818818843 .

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	C45Rules $_G M_t st$	4.032311680588985	5.5230869420000925E-5	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0361155446259
7	REGALTC $_G M_t st$	3.3317419170278892	8.630425232002421E-4	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0361155446259
6	REGAL $_G M_t st$	3.159020800205222	0.0015830019191880645	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0361155446259
5	GAssist $_G M_t st$	3.046832785072743	0.002312663229279731	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0361155446259
4	Ripper $_G M_t st$	2.8337562671232854	0.004600440508046975	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0361155446259
3	OCEC $_G M_t st$	2.817614106672568	0.004838191976598596	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0361155446259
2	SIA $_G M_t st$	2.442308876193409	0.014593654604100203	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0361155446259
1	Oblique-DT $_G M_t st$	1.0072708121247111	0.3138046521069825	0.05	0.0500000000000000044	0.05	0.0500000000000000044	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 $\leq 0.0500000000000000044$.

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

Finner's procedure rejects those hypotheses that have a p-value $\leq 0.0500000000000000044$.

Li's procedure rejects those hypotheses that have a p-value ≤ 0.03611554462594829 .

Table 8: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	C45Rules $_G M_t st$	2.136450758146878E-17	1.7091606065175024E-16	1.7091606065175024E-16	1.7091606065175024E-16	1.7091606065175024E-16
2	REGAL $_G M_t st$	1.0827128750768566E-14	8.661703000614853E-14	7.578990125537996E-14	7.578990125537996E-14	7.578990125537996E-14
3	REGALTC $_G M_t st$	3.738533859392836E-14	2.9908270875142686E-13	2.2431203156357016E-13	2.2431203156357016E-13	2.2431203156357016E-13
4	GAssist $_G M_t st$	7.425002642801194E-13	5.940002114240955E-12	3.712501321400597E-12	3.712501321400597E-12	3.712501321400597E-12
5	Ripper $_G M_t st$	1.6606166022401287E-11	1.328493281792103E-10	6.642466408960515E-11	6.642466408960515E-11	6.642466408960515E-11
6	OCEC $_G M_t st$	1.0898281461810055E-9	8.7186225169448044E-9	3.2694844385430166E-9	3.2694844385430166E-9	3.2694844385430166E-9
7	SIA $_G M_t st$	1.1732252595015243E-5	9.385802076012194E-5	2.3464505190030486E-5	2.3464505190030486E-5	2.3464505190030486E-5
8	Oblique-DT $_G M_t st$	0.016827409482756867	0.13461927586205494	0.016827409482756867	0.016827409482756867	0.016827409482756867

Table 9: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	C45Rules $_G M_t st$	2.136450758146878E-17	0.0	1.6248935655387346E-16	0.0	2.17301700510477E-17
2	REGAL $_G M_t st$	1.0827128750768566E-14	7.616129948928574E-14	7.20575983268976E-14	4.3520742565306136E-14	1.1012439581002088E-14
3	REGALTC $_G M_t st$	3.738533859392836E-14	2.2448709557920665E-13	2.1328528642755705E-13	9.980904991380157E-14	3.8025204276960836E-14
4	GAssist $_G M_t st$	7.425002642801194E-13	3.7125857943465235E-12	3.5305541713187875E-12	1.4850343177386094E-12	7.552084663883197E-13
5	Ripper $_G M_t st$	1.6606166022401287E-11	6.64246435632312E-11	6.333698602107761E-11	2.6569857425329246E-11	1.6890387488715854E-11
6	OCEC $_G M_t st$	1.0898281461810055E-9	3.26948434992147E-9	3.2694844385430166E-9	1.4531041925280874E-9	1.1084810088120922E-9
7	SIA $_G M_t st$	1.1732252595015243E-5	2.3464367544190345E-5	2.3464505190030486E-5	1.3408277443560657E-5	1.1932912601741865E-5
8	Oblique-DT $_G M_t st$	0.016827409482756867	0.01682740948275685	0.016827409482756867	0.01682740948275685	0.016827409482756867

Table 10: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	C45Rules $_G M_t st$	1.5077409853252038E-19	1.206192788260163E-18	1.206192788260163E-18	1.206192788260163E-18	1.206192788260163E-18
2	REGALTC $_G M_t st$	1.0419571629228546E-13	8.3356637303382837E-13	7.293700140459982E-13	7.293700140459982E-13	6.251742977537128E-13
3	REGAL $_G M_t st$	1.5645988259892123E-13	1.2516790607913698E-12	9.387592955935274E-13	9.387592955935274E-13	9.387592955935274E-13
4	GAssist $_G M_t st$	3.888620813974253E-12	3.110896651179402E-11	1.9443104069871263E-11	1.9443104069871263E-11	1.9443104069871263E-11
5	Ripper $_G M_t st$	2.0347475990756702E-11	1.6277980792605362E-10	8.138990396302681E-11	8.138990396302681E-11	8.138990396302681E-11
6	OCEC $_G M_t st$	4.1606317944933359E-9	3.328505435594687E-8	1.2481895383480077E-8	1.2481895383480077E-8	1.2481895383480077E-8
7	SIA $_G M_t st$	5.504884279226894E-6	4.403907423381515E-5	1.1009768558453787E-5	1.1009768558453787E-5	1.1009768558453787E-5
8	Oblique-DT $_G M_t st$	0.08587545442441995	0.6870036353953596	0.08587545442441995	0.08587545442441995	0.08587545442441995

Table 11: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Hol}	p_{Rom}	p_{Finn}	p_{Li}
1	C45Rules $_G M_t st$	1.5077409853252038E-19	0.0	1.1467236566121346E-18	0.0	1.6493824529958902E-19
2	REGALTC $_G M_t st$	1.0419571629228546E-13	7.297495940861154E-13	6.934519062997125E-13	4.169997680492088E-13	1.1398415762555262E-13
3	REGAL $_G M_t st$	1.5645988259892123E-13	9.385825450181073E-13	8.926117063428839E-13	4.171107903516713E-13	1.7115816805945103E-13
4	GAssist $_G M_t st$	3.888620813974253E-12	1.9443335830260366E-11	1.8490210840213778E-11	7.777334332104147E-12	4.253928890520311E-12
5	Ripper $_G M_t st$	2.0347475990756702E-11	8.139000584606038E-11	7.760658303983485E-11	3.2555957929503165E-11	2.2258975638261594E-11
6	OCEC $_G M_t st$	4.1606317944933359E-9	1.248189551716905E-8	1.2481895383480077E-8	5.5475091187418E-9	4.551493333916028E-9
7	SIA $_G M_t st$	5.504884279226894E-6	1.1009738254630363E-5	1.1009768558453787E-5	6.2912938453285605E-6	6.0219924686401285E-6
8	Oblique-DT $_G M_t st$	0.08587545442441995	0.0858754544244199	0.08587545442441995	0.0858754544244199	0.08587545442441995

Table 12: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hom}
1	C45Rules $_G M_t st$	5.523086942000925E-5	4.41846955360074E-4	4.41846955360074E-4	4.41846955360074E-4	4.41846955360074E-4
2	REGALTC $_G M_t st$	8.630425232002421E-4	0.006904340185601937	0.006041297662401694	0.006041297662401694	0.005396214201652706
3	REGAL $_G M_t st$	0.0015830019191880645	0.012664015353504516	0.009498011515128387	0.009498011515128387	0.007915009595940322
4	GAssist $_G M_t st$	0.002312663229279731	0.018501305834237848	0.011563316146398654	0.011563316146398654	0.009250652917118924
5	Ripper $_G M_t st$	0.004600440508046975	0.0368035240643758	0.0184017620321879	0.014514575929795787	0.013801321524140925
6	OCEC $_G M_t st$	0.004838191976598596	0.038705535812788766	0.0184017620321879	0.014514575929795787	0.014514575929795787
7	SIA $_G M_t st$	0.014593654604100203	0.11674923683280163	0.029187309208200406	0.029187309208200406	0.029187309208200406
8	Oblique-DT $_G M_t st$	0.3138046521069825	2.51043721085586	0.3138046521069825	0.3138046521069825	0.3138046521069825

Table 13: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Finn}	p_{Li}
1	C45Rules $_G M_t st$	5.523086942000925E-5	4.417615522243068E-4	4.417615522243068E-4	4.417615522243068E-4	8.048207335520336E-5
2	REGALTC $_G M_t st$	8.630425232002421E-4	0.006025678451733407	0.005743791628171113	0.003447703609187669	0.001256141450623161
3	REGAL $_G M_t st$	0.0015830019191880645	0.009460502331587128	0.009031107660055606	0.004215771754633502	0.002301616385017492
4	GAssist $_G M_t st$	0.002312663229279731	0.01150995558205592	0.010996605932397041	0.004619978047347373	0.0033589489038914617
5	Ripper $_G M_t st$	0.004600440508046975	0.01827516672292684	0.014514575929795787	0.007350539826149083	0.006659624429232966
6	OCEC $_G M_t st$	0.004838191976598596	0.01827516672292684	0.014514575929795787	0.007350539826149083	0.007001385167949249
7	SIA $_G M_t st$	0.014593654604100203	0.02897433445349673	0.029187309208200406	0.01666100372345125	0.020824605626085332
8	Oblique-DT $_G M_t st$	0.3138046521069825	0.3138046521069825	0.3138046521069825	0.3138046521069825	0.3138046521069825