

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 $_G M_t st$	5.92857142857143
OCEC $_G M_t st$	3.8571428571428577
Ripper $_G M_t st$	5.392857142857143
Gassist $_G M_t st$	3.9047619047619047
REGAL $_G M_t st$	5.964285714285715
UCS $_G M_t st$	3.380952380952381
REGALTC $_G M_t st$	5.3571428571428585
SIA $_G M_t st$	6.3571428571428585
Oblique-DT $_G M_t st$	4.857142857142856

Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 50.75396825396849. P-value computed by Friedman

Test: 2.930175491133724E-8.

Iman and Davenport statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 7.295150385353813. P-value computed by Iman and Davenport Test: 6.323939686298501E-9.

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

Algorithm	Ranking
C45Rules _G <i>M_tst</i>	209.16666666666666
OCEC _G <i>M_tst</i>	134.3809523809524
Ripper _G <i>M_tst</i>	222.8690476190476
GAssist _G <i>M_tst</i>	141.80952380952385
REGAL _G <i>M_tst</i>	229.53571428571428
UCS _G <i>M_tst</i>	124.21428571428575
REGALTC _G <i>M_tst</i>	210.97619047619048
SIA _G <i>M_tst</i>	254.35714285714283
Oblique-DT _G <i>M_tst</i>	178.1904761904762

Aligned Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 38.13657070477005. P-value computed by

Aligned Friedman Test: 7.1033152563293456E-6.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
C45Rules $_G M_t st$	5.528239202657807
OCEC $_G M_t st$	3.6057585825027676
Ripper $_G M_t st$	5.84828349944629
GAssist $_G M_t st$	3.550387596899226
REGAL $_G M_t st$	6.135105204872646
UCS $_G M_t st$	3.5027685492801766
REGALTC $_G M_t st$	5.320044296788481
SIA $_G M_t st$	6.619047619047619
Oblique-DT $_G M_t st$	4.890365448504982

Quade statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 6.8433255825511505. P-value computed by Quade Test: 2.525964888688502E-8.

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	-0.02481111	-0.00084278	-0.02408889	0.00844222	-0.02791222	-0.00224389	0.01915944	-0.01337778
OCEC $M_{f, st}$	0.02481111	0.00000000	0.02396833	0.00072222	0.03325333	-0.00310111	0.02256722	0.04397056	0.01143333
Ripper $M_{f, st}$	0.00084278	-0.02396833	0.00000000	-0.02324611	0.00928500	-0.02706944	-0.00140111	0.02000222	-0.01253500
GAssist $M_{f, st}$	0.02408889	-0.00072222	0.02324611	0.00000000	0.03253111	-0.00382333	0.02184500	0.04324833	0.01071111
REGAL $M_{f, st}$	-0.00844222	-0.03325333	-0.00928500	-0.03253111	0.00000000	-0.03635444	-0.01068611	0.01071722	-0.02182000
UCS $M_{f, st}$	0.02791222	0.00310111	0.02706944	0.00382333	0.03635444	0.00000000	0.02566833	0.04707167	0.01453444
REGALTC $M_{f, st}$	0.00224389	-0.02256722	0.00140111	-0.02184500	0.01068611	-0.02566833	0.00000000	0.02140333	-0.01113389
SIA $M_{f, st}$	-0.01915944	-0.04397056	-0.02000222	-0.04324833	-0.01071722	-0.04707167	-0.02140333	0.00000000	-0.03253722
Oblique-DT $M_{f, st}$	0.01337778	-0.01143333	0.01253500	-0.01071111	0.02182000	-0.01453444	0.01113389	0.03253722	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	SIA _G $M_t st$	4.980119205559976	6.354511986185815E-7	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0302338886095
7	REGAL _G $M_t st$	4.322743470426059	1.5410087639377638E-5	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0302338886095
6	C45Rules _G $M_t st$	4.26298203995934	2.0171673700313774E-5	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.0302338886095
5	Ripper _G $M_t st$	3.366560582958543	7.611186180892483E-4	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0302338886095
4	REGALIT _G $M_t st$	3.3067991524918248	9.4368527475798E-4	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0302338886095
3	Oblique-DT _G $M_t st$	2.4701391259577448	0.013506051336010513	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0302338886095
2	GAssist _G $M_t st$	0.8765009801785553	0.38075774376507987	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0302338886095
1	OCEC _G $M_t st$	0.7968190728895967	0.4255561164191284	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 ≤ 0.025 .

Hochberg's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.

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

Holland's procedure rejects those hypotheses that have a p-value $\leq 0.025320565519103666$.

Rom's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.

Finner's procedure rejects those hypotheses that have a p-value ≤ 0.04388935252272508 .

Li's procedure rejects those hypotheses that have a p-value ≤ 0.03023388860951956 .

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	5.458271101898707	4.807931679591481E-8	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0173779393480
7	REGAL _G M_t, st	4.41724519195919	9.99668094614933E-6	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.0127414550985666168	0.0173779393480
6	Ripper _G M_t, st	4.137641110632508	3.5089465011431395E-5	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0173779393480
5	REGAL _T M_t, st	3.638847401265805	2.738610096723118E-4	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0173779393480
4	C45Rules _G M_t, st	3.562954864905703	3.6670374783314655E-4	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0173779393480
3	Oblique-DT _G M_t, st	2.2637944727413775	0.023586758641128382	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0173779393480
2	GAssist _G M_t, st	0.7379550575014907	0.46054176006299063	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0173779393480
1	OCEC _G M_t, st	0.4263962240231882	0.6698191523879005	0.05	0.050000000000000044	0.05	0.050000000000000044	0.0173779393480

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 $\leq 0.016666666666666666$.
 Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.0125 .
 Hommel's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
 Holland's procedure rejects those hypotheses that have a p-value $\leq 0.016952427508441503$.
 Rom's procedure rejects those hypotheses that have a p-value $\leq 0.013109375000000001$.
 Finner's procedure rejects those hypotheses that have a p-value ≤ 0.04388935252272508 .
 Li's procedure rejects those hypotheses that have a p-value ≤ 0.01737793934800524 .

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	SIA $_G M_t st$	2.271201975415814	0.023134753904743847	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0014571337049
7	REGAL $_G M_t st$	1.918495769567658	0.05504817802109601	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0014571337049
6	Ripper $_G M_t st$	1.7094547917308793	0.08736673902291278	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0014571337049
5	C45Rules $_G M_t st$	1.4762005732180257	0.1398900557151635	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0014571337049
4	REGAL $T_C M_t st$	1.3244642649812894	0.18534890356161304	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0014571337049
3	Oblique-DT $_G M_t st$	1.0113063522373889	0.31186982670932045	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0014571337049
2	OCEC $_G M_t st$	0.07506104609583156	0.940166141066118	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0014571337049
1	GAssist $_G M_t st$	0.03470564496904168	0.9723144596062526	0.05	0.050000000000000044	0.05	0.050000000000000044	0.0014571337049

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 ≤ 0.00625 .

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

Holland's procedure rejects those hypotheses that have a p-value $\leq 0.006391150954545011$.

Finner's procedure rejects those hypotheses that have a p-value $\leq 0.006391150954545011$.

Li's procedure rejects those hypotheses that have a p-value $\leq 0.0014571337049340725$.

Table 8: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Homn}
1	SIA $_G M_t st$	6.354511986185815E-7	5.083609588948652E-6	5.083609588948652E-6	5.083609588948652E-6	5.083609588948652E-6
2	REGAL $_G M_t st$	1.5410087639377638E-5	1.232807011150211E-4	1.0787061347564346E-4	1.0787061347564346E-4	9.246052583626583E-5
3	C45Rules $_G M_t st$	2.0171673700313774E-5	1.613733896025102E-4	1.2103004220188264E-4	1.2103004220188264E-4	1.2103004220188264E-4
4	Ripper $_G M_t st$	7.611186180892483E-4	0.0060889484713986	0.003805593090446241	0.00377474109903192	0.00304447472356993
5	REGALTC $_G M_t st$	9.4368527475798E-4	0.00754948219806384	0.003805593090446241	0.00377474109903192	0.00377474109903192
6	Oblique-DT $_G M_t st$	0.013506051336010513	0.1080484106880841	0.040518154008031534	0.040518154008031534	0.040518154008031534
7	GAssist $_G M_t st$	0.38075774376507987	3.046061950120639	0.7615154875301597	0.4255561164191284	0.4255561164191284
8	OCEC $_G M_t st$	0.4255561164191284	3.404448931353027	0.7615154875301597	0.4255561164191284	0.4255561164191284

Table 9: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Hol}	p_{Rom}	p_{Finn}	p_{Li}
1	SIA $_G M_t st$	6.354511986185815E-7	5.083598282995538E-6	4.832971506185418E-6	5.083598282995538E-6	1.1062011692431266E-6
2	REGAL $_G M_t st$	1.5410087639377638E-5	1.0786562671694089E-4	1.0255848349653554E-4	6.163892574739815E-5	2.6825377897480684E-5
3	C45Rules $_G M_t st$	2.0171673700313774E-5	1.210239389195511E-4	1.1508043967785195E-4	6.163892574739815E-5	3.511390054052166E-5
4	Ripper $_G M_t st$	7.611186180892483E-4	0.003799804482432445	0.0035992763757157755	0.0015216579346276626	0.00132232127940117962
5	REGALTC $_G M_t st$	9.4368527475798E-4	0.003799804482432445	0.0035992763757157755	0.0015216579346276626	0.0016400863102323296
6	Oblique-DT $_G M_t st$	0.013506051336010513	0.039973377425009726	0.040518154008031534	0.017967409778764543	0.02297143095682092
7	GAssist $_G M_t st$	0.38075774376507987	0.6165390280930856	0.4255561164191284	0.4217356989571097	0.39861504928862357
8	OCEC $_G M_t st$	0.4255561164191284	0.6165390280930856	0.4255561164191284	0.4255561164191284	0.4255561164191284

Table 10: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	P_{Bonf}	P_{Holm}	P_{ocb}	P_{Hommel}
1	SIA $_G M_t, st$	4.807931679591481E-8	3.846345343673185E-7	3.846345343673185E-7	3.846345343673185E-7	3.846345343673185E-7
2	REGAL $_G M_t, st$	9.99668094614933E-6	7.997344756919464E-5	6.997676662304531E-5	6.997676662304531E-5	6.997676662304531E-5
3	Ripper $_G M_t, st$	3.5089465011431395E-5	2.8071572009145116E-4	2.1053679006858837E-4	2.1053679006858837E-4	2.1053679006858837E-4
4	REGALTC $_G M_t, st$	2.738610096723118E-4	0.0021908880773784944	0.001369305048361559	0.001369305048361559	0.0010954440386892472
5	C45Rules $_G M_t, st$	3.6670374783314655E-4	0.0029336299826651724	0.0014668149913325862	0.0014668149913325862	0.0014668149913325862
6	Oblique-DT $_G M_t, st$	0.023586758641128382	0.18869406912902706	0.07076027592338514	0.07076027592338514	0.07076027592338514
7	GAssist $_G M_t, st$	0.46054176006299063	3.68433408503925	0.9210835201259813	0.6698191523879005	0.6698191523879005
8	OCEC $_G M_t, st$	0.6698191523879005	5.358553219103204	0.9210835201259813	0.6698191523879005	0.6698191523879005

Table 11: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	P_{Hol}	P_{Rom} <th>P_{Finn}</th> <th>P_{Li}</th>	P_{Finn}	P_{Li}
1	SIA $_G M_t, st$	4.807931679591481E-8	3.84634469274836E-7	3.6567083139769464E-7	3.84634469274836E-7	1.4561507774468348E-7
2	REGAL $_G M_t, st$	9.99668094614933E-6	6.997466805169772E-5	6.6530737375234831E-5	3.998612418676384E-5	3.0275463777781906E-5
3	Ripper $_G M_t, st$	3.5089465011431395E-5	2.1051832187413133E-4	2.0018720913145217E-4	9.356917056158043E-5	1.0626217899118969E-4
4	REGALTC $_G M_t, st$	2.738610096723118E-4	0.001368555252025193	0.0013021963446674073	5.47647019491948E-4	8.287399226795842E-4
5	C45Rules $_G M_t, st$	3.6670374783314655E-4	0.0014660083587272332	0.0013986316961454933	5.866614469900444E-4	0.0011093827388055384
6	Oblique-DT $_G M_t, st$	0.023586758641128382	0.06910439251749012	0.07076027592338514	0.03132472702391775	0.06667303117698375
7	GAssist $_G M_t, st$	0.46054176006299063	0.7089848073640641	0.6698191523879005	0.506069217722466	0.5824315070705912
8	OCEC $_G M_t, st$	0.6698191523879005	0.7089848073640641	0.6698191523879005	0.6698191523879005	0.6698191523879005

Table 12: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{FDR}	p_{FDR}	p_{FDR}
1	SIA $_G M_t st$	0.023134753904743847	0.18507803123795077	0.18507803123795077	0.18507803123795077	0.18507803123795077	0.18507803123795077
2	REGAL $_G M_t st$	0.05504817802109601	0.4403854241687681	0.38533724614767206	0.38533724614767206	0.38533724614767206	0.38533724614767206
3	Ripper $_G M_t st$	0.08736673902291278	0.6989339121833023	0.5242004341374766	0.5242004341374766	0.5242004341374766	0.5242004341374766
4	C45Rules $_G M_t st$	0.1398900557151635	1.119120445721308	0.6994502785758174	0.6994502785758174	0.6994502785758174	0.6994502785758174
5	REGALTC $_G M_t st$	0.18534890356161304	1.4827912284929043	0.7413956142464522	0.7413956142464522	0.7413956142464522	0.7413956142464522
6	Oblique-DT $_G M_t st$	0.31186982670932045	2.4949586136745636	0.9356094801279613	0.9356094801279613	0.9356094801279613	0.9356094801279613
7	OCEC $_G M_t st$	0.940166141066118	7.521329128528944	1.880332282132236	1.880332282132236	1.880332282132236	1.880332282132236
8	GAssist $_G M_t st$	0.9723144596062526	7.778515676850021	1.880332282132236	1.880332282132236	1.880332282132236	1.880332282132236

Table 13: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Holm}	p_{Bonf}	p_{FDR}	p_{FDR}	p_{Li}
1	SIA $_G M_t st$	0.023134753904743847	0.1707656727776825	0.17595309705498033	0.1707656727776825	0.1707656727776825	0.45522668107474207
2	REGAL $_G M_t st$	0.05504817802109601	0.3272283736807484	0.3663611647908146	0.20266896832865766	0.20266896832865766	0.6653656946140558
3	Ripper $_G M_t st$	0.08736673902291278	0.42219970972336807	0.49843175580519894	0.21634763793008727	0.21634763793008727	0.7593655637757116
4	C45Rules $_G M_t st$	0.1398900557151635	0.5292722034005832	0.6651706989088166	0.26021088374233536	0.26021088374233536	0.8347877552781974
5	REGALTC $_G M_t st$	0.18534890356161304	0.59596601708884381	0.7069326476724216	0.2796316322224617	0.2796316322224617	0.8700419524668577
6	Oblique-DT $_G M_t st$	0.31186982670932045	0.6741544427848274	0.9356094801279613	0.39247968952279677	0.39247968952279677	0.9184653135364995
7	OCEC $_G M_t st$	0.940166141066118	0.9964199093250803	0.9723144596062526	0.9599847846996268	0.9599847846996268	0.9713948522029866
8	GAssist $_G M_t st$	0.9723144596062526	0.9964199093250803	0.9723144596062526	0.9723144596062526	0.9723144596062526	0.9723144596062526