

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 $_G M_t st$	5.119047619047619
OCEC $_G M_t st$	2.452380952380951
Ripper $_G M_t st$	3.3571428571428563
GAssist $_G M_t st$	6.928571428571429
REGAL $_G M_t st$	6.166666666666669
UCS $_G M_t st$	5.809523809523807
REGALTC $_G M_t st$	3.809523809523809
SIA $_G M_t st$	5.904761904761907
Oblique-DT $_G M_t st$	5.45238095238095

Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 97.32698412698412. P-value computed by Friedman

Test: 7.907952070951296E-11.

Iman and Davenport statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 16.719134899311. P-value computed by Iman and Davenport Test: 8.4614017310202E-21.

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

Algorithm	Ranking
C45Rules $_G M_t st$	204.3333333333334
OCEC $_G M_t st$	100.16666666666666
Ripper $_G M_t st$	121.16666666666666
GAssist $_G M_t st$	251.1190476190476
REGAL $_G M_t st$	234.23809523809524
UCS $_G M_t st$	218.30952380952385
REGALTC $_G M_t st$	136.57142857142858
SIA $_G M_t st$	223.5952380952381
Oblique-DT $_G M_t st$	216.00000000000003

Aligned Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 38.00518170669653. P-value computed by

Aligned Friedman Test: 7.511756535794056E-6.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
C45Rules _G M _t st	4.966777408637875
OCEC _G M _t st	2.0387596899224807
Ripper _G M _t st	3.424141749723145
GAssist _G M _t st	6.9125138427464
REGAL _G M _t st	6.452934662236989
UCS _G M _t st	5.953488372093023
REGALTC _G M _t st	3.692137320044296
SIA _G M _t st	6.176079734219269
Oblique-DT _G M _t st	5.3831672203765235

Quade statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 14.99258047666434. P-value computed by Quade Test: 9.779366590190958E-19.

Table 4: Contrast Estimation

C45Rules $G_{Mf, st}$	0.00000000	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	UCS $G_{Mf, st}$	0.00898167	REGALTC $G_{Mf, st}$	-0.03943944	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444
OCBC $G_{Mf, st}$	0.05931111	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	UCS $G_{Mf, st}$	0.00898167	REGALTC $G_{Mf, st}$	-0.03943944	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444
Ripper $G_{Mf, st}$	0.04413556	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	REGALTC $G_{Mf, st}$	-0.03943944	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	C45Rules $G_{Mf, st}$	0.00000000
GAssist $G_{Mf, st}$	-0.02599167	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	REGALTC $G_{Mf, st}$	-0.03943944	UCS $G_{Mf, st}$	0.00898167	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556
REGAL $G_{Mf, st}$	-0.01470278	REGALTC $G_{Mf, st}$	-0.03943944	UCS $G_{Mf, st}$	0.00898167	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167
UCS $G_{Mf, st}$	-0.00898167	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	REGALTC $G_{Mf, st}$	-0.03943944	UCS $G_{Mf, st}$	0.00898167
REGALTC $G_{Mf, st}$	-0.03943944	UCS $G_{Mf, st}$	0.00898167	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	REGALTC $G_{Mf, st}$	-0.03943944
SIA $G_{Mf, st}$	-0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	REGALTC $G_{Mf, st}$	-0.03943944	UCS $G_{Mf, st}$	0.00898167	SIA $G_{Mf, st}$	0.00727556
Oblique-DT $G_{Mf, st}$	0.00173444	C45Rules $G_{Mf, st}$	0.00000000	OCBC $G_{Mf, st}$	-0.05931111	Ripper $G_{Mf, st}$	-0.04413556	GAssist $G_{Mf, st}$	0.02599167	REGAL $G_{Mf, st}$	0.01470278	REGALTC $G_{Mf, st}$	-0.03943944	UCS $G_{Mf, st}$	0.00898167	SIA $G_{Mf, st}$	0.00727556	Oblique-DT $G_{Mf, st}$	0.00173444

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 $_G M_t st$	7.490099285162204	6.882153217564978E-14	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.04578752952777
7	REGAL $_G M_t st$	6.2151887685388525	5.126298525681927E-10	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.0127414550985666168	0.04578752952777
6	SIA $_G M_t st$	5.776938278449575	7.607217546120447E-9	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.04578752952777
5	UCS $_G M_t st$	5.617574463871647	1.9365672368618588E-8	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.04578752952777
4	Oblique-DT $_G M_t st$	5.019960159204452	5.168219754063904E-7	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.04578752952777
3	C45Rules $_G M_t st$	4.4621868081817375	8.112745200324518E-6	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.04578752952777
2	REGALTC $_G M_t st$	2.270934357735349	0.02315095198524629	0.025	0.025320565519103666	0.025	0.04388935252272508	0.04578752952777
1	Ripper $_G M_t st$	1.5139562384902325	0.13003693897217689	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 ≤ 0.04578752952778017 .

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	GAssist $_G M_t st$	6.331035270039849	2.435216657664746E-10	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0327130736087
7	REGAL $_G M_t st$	5.623037792680504	1.8762833277854038E-8	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0327130736087
6	SIA $_G M_t st$	5.176669848562553	2.2588141581995535E-7	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0327130736087
5	UCS $_G M_t st$	4.954983755510686	7.233633231387E-7	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0327130736087
4	Oblique-DT $_G M_t st$	4.858120913051085	1.1850503687095284E-6	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0327130736087
3	C45Rules $_G M_t st$	4.368813770729395	1.2492323562278548E-5	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0327130736087
2	REGALTC $_G M_t st$	1.5268380012446272	0.12680129948528973	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0327130736087
1	Ripper $_G M_t st$	0.8807528561790454	0.37845160143321355	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 ≤ 0.03271307360877824 .

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 $_G M_t st$	3.552082407180169	3.821951425504657E-4	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0361766941473
7	REGAL $_G M_t st$	3.2171325778278024	0.001294787517679073	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0361766941473
6	SIA $_G M_t st$	3.015355572193845	0.0025667815080136934	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0361766941473
5	UCS $_G M_t st$	2.853126859664144	0.004329133568672794	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0361766941473
4	Oblique-DT $_G M_t st$	2.4374662280581947	0.014790595731639475	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0361766941473
3	C45Rules $_G M_t st$	2.1339936115847244	0.03284330376478498	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0361766941473
2	REGALTC $_G M_t st$	1.2050122776459875	0.22819856221940304	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0361766941473
1	Ripper $_G M_t st$	1.009692136192318	0.3126428112004472	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 ≤ 0.0125 .

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 ≤ 0.04388935252272508 .

Li's procedure rejects those hypotheses that have a p-value ≤ 0.03617669414734489 .

Table 8: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	GAssist $_G M_t st$	6.882153217564978E-14	5.505722574051983E-13	5.505722574051983E-13	5.505722574051983E-13	5.505722574051983E-13
2	REGAL $_G M_t st$	5.126298525681927E-10	4.101038820545542E-9	3.5884089679773488E-9	3.5884089679773488E-9	3.5884089679773488E-9
3	SIA $_G M_t st$	7.607217546120447E-9	6.085774036896358E-8	4.564330527672269E-8	4.564330527672269E-8	4.564330527672269E-8
4	UCS $_G M_t st$	1.9365672368618588E-8	1.549253789489487E-7	9.682836184309294E-8	9.682836184309294E-8	9.682836184309294E-8
5	Oblique-DT $_G M_t st$	5.168219754063904E-7	4.134575803251123E-6	2.0672879016255615E-6	2.0672879016255615E-6	2.0672879016255615E-6
6	C45Rules $_G M_t st$	8.112745200324518E-6	6.490196160259614E-5	2.4338235600973555E-5	2.4338235600973555E-5	2.4338235600973555E-5
7	REGALTC $_G M_t st$	0.02315095198524629	0.18520761588197032	0.04630190397049258	0.04630190397049258	0.04630190397049258
8	Ripper $_G M_t st$	0.13003693897217689	1.040295511777415	0.13003693897217689	0.13003693897217689	0.13003693897217689

Table 9: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	GAssist $_G M_t st$	6.882153217564978E-14	5.506706202140776E-13	5.23427298178067E-13	5.506706202140776E-13	7.910856823545442E-14
2	REGAL $_G M_t st$	5.126298525681927E-10	3.5884087923321317E-9	3.411696383874021E-9	2.0505193099040753E-9	5.892547341728205E-10
3	SIA $_G M_t st$	7.607217546120447E-9	4.564330424727814E-8	4.3399568768504985E-8	2.0285913282513945E-8	8.74429940808414E-9
4	UCS $_G M_t st$	1.9365672368618588E-8	9.682835822033553E-8	9.208287006834673E-8	3.8731344446497062E-8	2.226033817418924E-8
5	Oblique-DT $_G M_t st$	5.168219754063904E-7	2.067286299145543E-6	1.971192278069665E-6	8.269150324480279E-7	5.940731181916458E-7
6	C45Rules $_G M_t st$	8.112745200324518E-6	2.43380381514946E-5	2.4338235600973555E-5	1.0816978974426128E-5	9.32530346395264E-6
7	REGALTC $_G M_t st$	0.02315095198524629	0.04576593739266943	0.04630190397049258	0.026414185911517674	0.025921608717282007
8	Ripper $_G M_t st$	0.13003693897217689	0.13003693897217694	0.13003693897217689	0.13003693897217694	0.13003693897217689

Table 10: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{ocb}	p_{omm}
1	GAssist $_G M_t st$	2.435216657664746E-10	1.9481733261317966E-9	1.9481733261317966E-9	1.9481733261317966E-9	1.9481733261317966E-9
2	REGAL $_G M_t st$	1.8762833277854038E-8	1.501026662228323E-7	1.3133983294497826E-7	1.3133983294497826E-7	1.3133983294497826E-7
3	SIAG $_G M_t st$	2.2588141581995535E-7	1.8070513265596428E-6	1.355288494919732E-6	1.355288494919732E-6	1.355288494919732E-6
4	UCS $_G M_t st$	7.233633231387E-7	5.7869065851096E-6	3.6168166156935002E-6	3.6168166156935002E-6	2.962625921773821E-6
5	Oblique-DT $_G M_t st$	1.1850503687095284E-6	9.480402949676227E-6	4.740201474838114E-6	4.740201474838114E-6	4.740201474838114E-6
6	C45Rules $_G M_t st$	1.2492323562278548E-5	9.9938858849822838E-5	3.7476970686835644E-5	3.7476970686835644E-5	3.7476970686835644E-5
7	REGALTC $_G M_t st$	0.12680129948528973	1.0144103958823179	0.25360259897057946	0.25360259897057946	0.25360259897057946
8	Ripper $_G M_t st$	0.37845160143321355	3.0276128114657084	0.37845160143321355	0.37845160143321355	0.37845160143321355

Table 11: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Hall}	p_{Finn}	p_{Li}
1	GAssist $_G M_t st$	2.435216657664746E-10	1.9481731783344003E-9	1.8521221997011517E-9	1.9481731783344003E-9
2	REGAL $_G M_t st$	1.8762833277854038E-8	1.3133982557089752E-7	1.248719521982392E-7	7.505133103880013E-8
3	SIAG $_G M_t st$	2.2588141581995535E-7	1.355287729376542E-6	1.2886651367561937E-6	6.023503287266863E-7
4	UCS $_G M_t st$	7.233633231387E-7	3.616811383055918E-6	3.439558907581574E-6	1.4467261230111106E-6
5	Oblique-DT $_G M_t st$	1.1850503687095284E-6	4.740193048857755E-6	4.519858378868284E-6	1.896079915852944E-6
6	C45Rules $_G M_t st$	1.2492323562278548E-5	3.747650251428869E-5	3.7476970686835644E-5	1.6656396736647316E-5
7	REGALTC $_G M_t st$	0.12680129948528973	0.2375240294194213	0.25360259897057946	0.14355266229421737
8	Ripper $_G M_t st$	0.37845160143321355	0.37845160143321355	0.37845160143321355	0.37845160143321355

Table 12: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{ocb}	p_{holm}
1	GAssist $_G M_t st$	3.821951425504657E-4	0.0030575611404037254	0.0030575611404037254	0.0030575611404037254	0.0030575611404037254
2	REGAL $_G M_t st$	0.001294787517679073	0.0103583001414325583	0.00906351262375351	0.00906351262375351	0.008983735278047926
3	SIA $_G M_t st$	0.0025667815080136934	0.020534252064109547	0.01540068904808216	0.01540068904808216	0.012987400706018382
4	UCS $_G M_t st$	0.004329133568672794	0.034633068549382355	0.021645667843363973	0.021645667843363973	0.021645667843363973
5	Oblique-DT $_G M_t st$	0.014790595731639475	0.1183247658531158	0.0591623829265579	0.0591623829265579	0.0591623829265579
6	C45Rules $_G M_t st$	0.03284330376478498	0.26274643011827986	0.09852991129435495	0.09852991129435495	0.09852991129435495
7	REGAL $_TC M_t st$	0.22819856221940304	1.8255884977552244	0.4563971244388061	0.3126428112004472	0.3126428112004472
8	Ripper $_G M_t st$	0.3126428112004472	2.5011424896035774	0.4563971244388061	0.3126428112004472	0.3126428112004472

Table 13: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	GAssist $_G M_t st$	3.821951425504657E-4	0.0030533474217747376	0.002906813674699805	0.003053474217747376	5.557267061829927E-4
2	REGAL $_G M_t st$	0.001294787517679073	0.00902838253017424	0.00861717644772411	0.00516909902324281	0.0018801768704757495
3	SIA $_G M_t st$	0.0025667815080136934	0.015302201105991009	0.01464362099485086	0.006830118224641302	0.0037203831414488004
4	UCS $_G M_t st$	0.004329133568672794	0.021459063454259186	0.020584828469916494	0.008639525739890241	0.00625881042992222
5	Oblique-DT $_G M_t st$	0.014790595731639475	0.05786270720205833	0.056412284077766765	0.0235597393849154	0.021064790144591585
6	C45Rules $_G M_t st$	0.03284330376478498	0.09532929098816645	0.09852991129435495	0.04354959056579877	0.04560300097524715
7	REGAL $_TC M_t st$	0.22819856221940304	0.40432254063980333	0.3126428112004472	0.2562363447356808	0.24924594921219428
8	Ripper $_G M_t st$	0.3126428112004472	0.40432254063980333	0.3126428112004472	0.3126428112004471	0.3126428112004472