

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 $_G M_t st$	3.7857142857142856
OCEC $_G M_t st$	3.476190476190476
Ripper $_G M_t st$	6.523809523809527
GAssist $_G M_t st$	3.452380952380951
REGAL $_G M_t st$	6.119047619047621
UCS $_G M_t st$	4.357142857142857
REGALTC $_G M_t st$	5.404761904761905
SIA $_G M_t st$	8.071428571428575
Oblique-DT $_G M_t st$	3.8095238095238093

Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 118.68571428571482. P-value computed by Friedman

Test: 1.0146206097516597E-10.

Iman and Davenport statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 22.39205890086789. P-value computed by Iman and Davenport Test: 3.1893725960755334E-27.

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

Algorithm	Ranking
C45Rules $_G M_t st$	139.45238095238096
OCEC $_G M_t st$	129.85714285714286
Ripper $_G M_t st$	265.2142857142857
GAssist $_G M_t st$	125.83333333333334
REGAL $_G M_t st$	255.40476190476198
UCS $_G M_t st$	146.1904761904762
REGALTC $_G M_t st$	195.85714285714278
SIA $_G M_t st$	316.4285714285714
Oblique-DT $_G M_t st$	131.26190476190476

Aligned Friedman statistic (distributed according to chi-square with 8 degrees of freedom: 37.06045910861379. P-value computed by

Aligned Friedman Test: 1.1217972893051709E-5.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
C45Rules $_G M_t st$	3.622369878183832
OCEC $_G M_t st$	3.1638981173864895
Ripper $_G M_t st$	6.705426356589149
GAssist $_G M_t st$	2.976744186046511
REGAL $_G M_t st$	6.492801771871539
UCS $_G M_t st$	4.125138427464008
REGALTC $_G M_t st$	5.832779623477298
SIA $_G M_t st$	8.372093023255816
Oblique-DT $_G M_t st$	3.7087486157253604

Quade statistic (distributed according to F-distribution with 8 and 328 degrees of freedom: 23.74283222273334. P-value computed by

Quade Test: 1.1220135849759297E-28.

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	-0.00106778	0.05631500	-0.00231500	0.04648500	0.00808167	0.01994611	0.11203889	0.00007611
OCEC $M_{f, st}$	0.00106778	0.00000000	0.05738278	-0.00124722	0.04755278	0.00914944	0.02101389	0.11310667	0.00114389
Ripper $M_{f, st}$	-0.05631500	-0.05738278	0.00000000	0.05863000	-0.00983000	-0.04823333	-0.03636889	0.05572389	-0.05623889
GAssist $M_{f, st}$	0.00231500	0.00124722	0.05863000	0.00000000	0.04880000	0.01039667	0.02226111	0.11435389	0.00230111
REGAL $M_{f, st}$	-0.04648500	-0.04755278	0.00983000	-0.04880000	0.00000000	-0.03840333	-0.02653889	0.06555389	-0.04640889
UCS $M_{f, st}$	-0.00808167	-0.00914944	0.04823333	-0.01039667	0.03840333	0.00000000	0.01186444	0.10395722	-0.00800556
REGALTC $M_{f, st}$	-0.01994611	-0.02101389	0.03636889	-0.02226111	0.02653889	-0.01039667	0.00000000	0.09209278	-0.01987000
SIA $M_{f, st}$	-0.11203889	-0.11310667	-0.05572389	-0.11435389	-0.06555389	-0.10395722	-0.09209278	0.00000000	-0.11196278
Oblique-DT $M_{f, st}$	-0.00007611	-0.00114389	0.05623889	-0.00239111	0.04640889	0.00800556	0.01987000	0.11196278	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 $M_t.st$	7.7291450070290875	1.0827128750768018E-14	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0016726354
7	Ripper _G $M_t.st$	5.1394830201379005	2.754953845326368E-7	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.0016726354
6	REGAL _G $M_t.st$	4.462186808181742	8.112745200324352E-6	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0016726354
5	REGAL _C $M_t.st$	3.2669581988473455	0.0010870973064379737	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0016726354
4	UCS _G $M_t.st$	1.5139562384902334	0.13003693897217664	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.0016726354
3	Oblique-DT _G $M_t.st$	0.5976143046671984	0.5500973172303958	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0016726354
2	C45Rules _G $M_t.st$	0.5577733510227189	0.5769991622487395	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0016726354
1	OCEC _G $M_t.st$	0.039840953644481134	0.9682199258487562	0.05	0.050000000000000044	0.05	0.050000000000000044	0.0016726354

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 $\leq 0.031549888917161595$.

Li's procedure rejects those hypotheses that have a p-value $\leq 0.0016726354816444132$.

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	7.993680967928862	1.3096840349933695E-15	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.007053441666
7	Ripper _G M_t, st	5.845722471737111	5.043743482668611E-9	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.012741455098566168	0.007053441666
6	REGAL _G M_t, st	5.4343050377849975	5.501040619447211E-8	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490195694	0.007053441666
5	REGAL _T M_t, st	2.936841439348857	0.0033157358813297485	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.007053441666
4	UCS _G M_t, st	0.8537910340511156	0.39322078320367587	0.0125	0.012741455098566168	0.013109375000000001	0.031549888917161595	0.007053441666
3	C45Rules _G M_t, st	0.57119119471022	0.5678700463288147	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.007053441666
2	Oblique-DT _G M_t, st	0.22767760908029694	0.8198968806677344	0.025	0.025320565519103666	0.025	0.0438893525272508	0.007053441666
1	OCEC _G M_t, st	0.16876103480074656	0.8659846083702561	0.05	0.0500000000000000044	0.05	0.0500000000000000044	0.007053441666

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 $\leq 0.031549888917161595$.

Li's procedure rejects those hypotheses that have a p-value $\leq 0.0070534416664723362$.

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	3.932230285794545	8.416138336146238E-5	0.00625	0.006391150954545011	0.006574125233361166	0.006391150954545011	0.0057103115281
7	Ripper _G M_t, st	2.7175327118781274	0.006577065356224133	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.0127414550985666168	0.0057103115281
6	REGAL _G M_t, st	2.562567971551247	0.010390124757286416	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.019051173490193694	0.0057103115281
5	REGAL _T M_t, st	2.081531590119895	0.03738527570990435	0.01	0.010206218313011495	0.010515350115740741	0.025320565519103666	0.0057103115281
4	UCS _G M_t, st	0.836971019369651	0.4026088582429918	0.0125	0.0127414550985666168	0.013109375000000001	0.031549888917161595	0.0057103115281
3	Oblique-DP _G M_t, st	0.5334984028961816	0.5936886163072765	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03773939976903784	0.0057103115281
2	C45Rules _G M_t, st	0.4705439771383869	0.637966422441956	0.025	0.025320565519103666	0.025	0.04388935252272508	0.0057103115281
1	OCEC _G M_t, st	0.13640125580855494	0.8915040809659557	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 $\leq 0.008333333333333333$.
 Hochberg's procedure rejects those hypotheses that have a p-value $\leq 0.0071428571428571435$.
 Hommel's procedure rejects those hypotheses that have a p-value $\leq 0.008333333333333333$.
 Holland's procedure rejects those hypotheses that have a p-value $\leq 0.008512444610847103$.
 Rom's procedure rejects those hypotheses that have a p-value $\leq 0.0075128293213784685$.
 Finner's procedure rejects those hypotheses that have a p-value $\leq 0.025320565519103666$.
 Li's procedure rejects those hypotheses that have a p-value $\leq 0.005710311528107596$.

Table 8: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Holm}
1	SIA $_G M_t st$	1.0827128750768018E-14	8.661703000614415E-14	8.661703000614415E-14	8.661703000614415E-14	8.661703000614415E-14
2	Ripper $_G M_t st$	2.754953845326368E-7	2.2039630762610944E-6	1.9284676917284577E-6	1.9284676917284577E-6	1.9284676917284577E-6
3	REGAL $_G M_t st$	8.112745200324352E-6	6.490196160259481E-5	4.867647120194611E-5	4.867647120194611E-5	4.867647120194611E-5
4	REGALTC $_G M_t st$	0.0010870973064379737	0.00869677845150379	0.005435486532189868	0.005435486532189868	0.005435486532189868
5	UCS $_G M_t st$	0.13003693897217664	1.040295511777413	0.5201477558887065	0.5201477558887065	0.5201477558887065
6	Oblique-DT $_G M_t st$	0.5500973172303958	4.400778537843166	1.6502919516911874	0.9682199258487562	0.9682199258487562
7	C45Rules $_G M_t st$	0.5769991622487395	4.615993297989916	1.6502919516911874	0.9682199258487562	0.9682199258487562
8	OCEC $_G M_t st$	0.9682199258487562	7.745759406790049	1.6502919516911874	0.9682199258487562	0.9682199258487562

Table 9: Adjusted p -values (FRIEDMAN)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	SIA $_G M_t st$	1.0827128750768018E-14	8.704148513061227E-14	8.23465359552296E-14	8.704148513061227E-14	3.4068922241141304E-13
2	Ripper $_G M_t st$	2.754953845326368E-7	1.9284660977003654E-6	1.833499556210392E-6	1.101981082607395E-6	8.668733591540732E-6
3	REGAL $_G M_t st$	8.112745200324352E-6	4.8675483962923310E-5	4.62836301299672E-5	2.163384094189258E-5	2.552125802818862E-4
4	REGALTC $_G M_t st$	0.0010870973064379737	0.005423681566776195	0.005169097055601911	0.0021730128323222964	0.03307547495645204
5	UCS $_G M_t st$	0.13003693897217664	0.42719968149947196	0.4959692547210551	0.19979492700300727	0.8036048649161215
6	Oblique-DT $_G M_t st$	0.5500973172303958	0.9089341074330186	0.9682199258487562	0.6552601853209218	0.9453835555673501
7	C45Rules $_G M_t st$	0.5769991622487395	0.9089341074330186	0.9682199258487562	0.6552601853209218	0.9477970465300763
8	OCEC $_G M_t st$	0.9682199258487562	0.9682199258487562	0.9682199258487562	0.9682199258487562	0.9682199258487562

Table 10: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	SIA $_G M_t st$	1.3096840349933695E-15	1.0477472279946956E-14	1.0477472279946956E-14	1.0477472279946956E-14	1.0477472279946956E-14
2	Ripper $_G M_t st$	5.043743482668611E-9	4.034994786134889E-8	3.530620437868028E-8	3.530620437868028E-8	3.530620437868028E-8
3	REGAL $_G M_t st$	5.501040619447211E-8	4.400832495557769E-7	3.300624371668327E-7	3.300624371668327E-7	3.300624371668327E-7
4	REGAL $TC_G M_t st$	0.0033157358813297485	0.02652588705063799	0.01657867940664874	0.01657867940664874	0.01657867940664874
5	UCS $_G M_t st$	0.39322078320367587	3.145766265629407	1.5728831328147035	0.8659846083702561	0.8659846083702561
6	C45Rules $_G M_t st$	0.5678700463288147	4.5429660370630517	1.703610138986444	0.8659846083702561	0.8659846083702561
7	Oblique-DT $_G M_t st$	0.8198968806677344	6.559175045341875	1.703610138986444	0.8659846083702561	0.8659846083702561
8	OCEC $_G M_t st$	0.8659846083702561	6.927876866962049	1.703610138986444	0.8659846083702561	0.8659846083702561

Table 11: Adjusted p -values (ALIGNED FRIEDMAN)

i	algorithm	unadjusted p	p_{Hol}	p_{Rom}	p_{Finn}	p_{Li}
1	SIA $_G M_t st$	1.3096840349933695E-15	1.0658141036401503E-14	9.96089965207253E-15	1.0658141036401503E-14	9.772638941441413E-15
2	Ripper $_G M_t st$	5.043743482668611E-9	3.530620418246144E-8	3.3567536722258295E-8	2.017497402473367E-8	3.76355239072342E-8
3	REGAL $_G M_t st$	5.501040619447211E-8	3.30062391973307E-7	3.138372068559986E-7	1.4669440984160786E-7	4.1047810214133465E-7
4	REGAL $TC_G M_t st$	0.0033157358813297485	0.01646910229381593	0.015766169670215376	0.0066204776582247105	0.0241440956771699662
5	UCS $_G M_t st$	0.39322078320367587	0.8644427380316398	0.8659846083702561	0.5503763826780613	0.7458152569442225
6	C45Rules $_G M_t st$	0.5678700463288147	0.9193056526892196	0.8659846083702561	0.6732974722078906	0.8090637241035673
7	Oblique-DT $_G M_t st$	0.8198968806677344	0.9675628664067877	0.8659846083702561	0.8590168774021194	0.8595097311129352
8	OCEC $_G M_t st$	0.8659846083702561	0.9675628664067877	0.8659846083702561	0.8659846083702561	0.8659846083702563

Table 12: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Hommel}
1	SIA $_G M_t st$	8.416138336146238E-5	6.73291066891699E-4	6.73291066891699E-4	6.73291066891699E-4	6.73291066891699E-4
2	Ripper $_C M_t st$	0.006577065356224133	0.05261652284979306	0.04603945749356893	0.04603945749356893	0.039462392137344794
3	REGAL $_G M_t st$	0.010390124757286416	0.08312099805829133	0.0623407485437185	0.0623407485437185	0.0623407485437185
4	REGAL $TC_G M_t st$	0.03738527570990435	0.2990822056792348	0.18692637854952177	0.18692637854952177	0.18692637854952177
5	UCS $_G M_t st$	0.4026088582429918	3.2208708659439345	1.6104354329719672	0.8915040809659557	0.8915040809659557
6	Oblique-DT $_G M_t st$	0.5936886163072765	4.749508930458212	1.7810658489218296	0.8915040809659557	0.8915040809659557
7	C45Rules $_G M_t st$	0.637966422441956	5.103731379535648	1.7810658489218296	0.8915040809659557	0.8915040809659557
8	OCEC $_G M_t st$	0.8915040809659557	7.1320326477276454	1.7810658489218296	0.8915040809659557	0.8915040809659557

Table 13: Adjusted p -values (QUADE)

i	algorithm	unadjusted p	p_{Holl}	p_{Rom}	p_{Finn}	p_{Li}
1	SIA $_G M_t st$	8.416138336146238E-5	6.730927723943569E-4	6.400956809765018E-4	6.730927723943569E-4	7.751088693057455E-4
2	Ripper $_C M_t st$	0.006577065356224133	0.045140936521104846	0.04377222664641449	0.02604985085867384	0.05715559904067588
3	REGAL $_G M_t st$	0.010390124757286416	0.060743687323137174	0.059276198055774436	0.027467654424608412	0.08739566416663008
4	REGAL $TC_G M_t st$	0.03738527570990435	0.17346261454036038	0.1777652446110245	0.07337289257990309	0.2562720697175752
5	UCS $_G M_t st$	0.4026088582429918	0.8726393948253632	0.8915040809659557	0.5614551193835815	0.7877227452029159
6	Oblique-DT $_G M_t st$	0.5936886163072765	0.9329224841456456	0.8915040809659557	0.6990608752098045	0.8454880254785073
7	C45Rules $_G M_t st$	0.637966422441956	0.9329224841456456	0.8915040809659557	0.6990608752098045	0.8546531914530177
8	OCEC $_G M_t st$	0.8915040809659557	0.9329224841456456	0.8915040809659557	0.8915040809659557	0.8915040809659558