

Results

April 6, 2021

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

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Table 1: Average Rankings of the algorithms

| Algorithm | Ranking |
|--------------|--------------------|
| parzen | 2.954545454545453 |
| parzen des | 1.954545454545454 |
| parzen destr | 1.0909090909090906 |

Friedman statistic considering reduction performance (distributed according to chi-square with 2 degrees of freedom: 38.2727272726954.
P-value computed by Friedman Test: 4.942269260510557E-9.

Iman and Davenport statistic considering reduction performance (distributed according to F-distribution with 2 and 42 degrees of freedom: 140.3333333332433.

P-value computed by Iman and Davenport Test: 2.53745847591088E-19.

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

Table 2: Holm / Hochberg Table for $\alpha = 0.05$

| i | algorithm | $z = (R_0 - R_i)/SE$ | p | Holm/Hochberg/Hommel |
|-----|------------|----------------------|----------------------|----------------------|
| 2 | parzen | 6.180982563844149 | 6.37038531465702E-10 | 0.025 |
| 1 | parzen des | 2.864357773488753 | 0.004178557568166526 | 0.05 |

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

Table 3: Holm / Hochberg Table for $\alpha = 0.10$

| i | algorithm | $z = (R_0 - R_i)/SE$ | p | Holm/Hochberg/Hommel |
|-----|------------|----------------------|----------------------|----------------------|
| 2 | parzen | 6.180982563844149 | 6.37038531465702E-10 | 0.05 |
| 1 | parzen des | 2.864357773488753 | 0.004178557568166526 | 0.1 |

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.05 .
Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.1 .
Hommel's procedure rejects all hypotheses.

Table 4: Adjusted p -values

| i | algorithm | unadjusted p | p_{Bonf} | p_{Holm} | p_{Hoch} | p_{Hommel} |
|-----|------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 | parzen | 6.37038531465702E-10 | 1.274077062931404E-9 | 1.274077062931404E-9 | 1.274077062931404E-9 | 1.274077062931404E-9 |
| 2 | parzen des | 0.004178557568166526 | 0.008357115136333053 | 0.004178557568166526 | 0.004178557568166526 | 0.004178557568166526 |

Table 5: Holm / Shaffer Table for $\alpha = 0.05$

| i | algorithms | $z = (R_0 - R_i)/SE$ | p | Holm | Shaffer |
|-----|------------------------------|----------------------|----------------------|----------------------|----------------------|
| 3 | parzen vs. parzen desthr | 6.180982563844149 | 6.37038531465702E-10 | 0.016666666666666666 | 0.016666666666666666 |
| 2 | parzen vs. parzen des | 3.3166247903553963 | 9.111188771537253E-4 | 0.025 | 0.05 |
| 1 | parzen des vs. parzen desthr | 2.864357773488753 | 0.004178557568166526 | 0.05 | 0.05 |

Nemenyi's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Shaffer's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Bergmann's procedure rejects these hypotheses:

- parzen vs. parzen des
- parzen vs. parzen desthr
- parzen des vs. parzen desthr

Table 6: Holm / Shaffer Table for $\alpha = 0.10$

| i | algorithms | $z = (R_0 - R_k)/SE$ | p | Holm | Shaffer |
|-----|------------------------------|----------------------|----------------------|--------------------|--------------------|
| 3 | parzen vs. parzen desthr | 6.180982563844149 | 6.37038531465702E-10 | 0.0333333333333333 | 0.0333333333333333 |
| 2 | parzen vs. parzen des | 3.3166247903553963 | 9.111188771537253E-4 | 0.05 | 0.1 |
| 1 | parzen des vs. parzen desthr | 2.864357773488753 | 0.004178557568166526 | 0.1 | 0.1 |

Nemenyi's procedure rejects those hypotheses that have a p-value ≤ 0.0333333333333333 .
 Shaffer's procedure rejects those hypotheses that have a p-value ≤ 0.0333333333333333 .
 Bergmann's procedure rejects these hypotheses:

- parzen vs. parzen des
- parzen vs. parzen desthr
- parzen des vs. parzen desthr

Table 7: Adjusted p -values

| i | hypothesis | unadjusted p | p_{Nemc} | p_{Holm} | p_{Shaf} | p_{Berg} |
|-----|------------------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|
| 1 | parzen vs .parzen desthr | 6.37038531465702E-10 | 1.911115594397106E-9 | 1.911115594397106E-9 | 1.911115594397106E-9 | 1.911115594397106E-9 |
| 2 | parzen vs .parzen des | 9.111188771537253E-4 | 0.002733356631461176 | 0.0018222377543074507 | 9.111188771537253E-4 | 9.111188771537253E-4 |
| 3 | parzen des vs .parzen desthr | 0.004178557568166526 | 0.012535672704499578 | 0.004178557568166526 | 0.004178557568166526 | 0.004178557568166526 |