Multiple-comparison and multiple-testing reference

Notations and abbreviations

$\nu =$ d.f. for error for the comparison/contrast in question

$g =$ number of groups in the family

$k =$ span of current range

$K =$ number of comparisons or tests in family

$\mathcal{E} =$ specified value of error rate

CER comparisonwise error rate

FER familywise [experimentwise] error rate

FDR false discovery rate

SFER strong familywise error rate

SCI simultaneous confidence intervals

Exact Exact, under standard assumptions: normality, independence, homogeneity

Multiply the standard error of a comparison or contrast by the critical value to obtain a cutoff value for the comparison or contrast.

METHOD	CONTROLS	STEP-DOWN	CRITICAL VALUE	NOTES
Bonferroni	SCI	no	Sig. level $\mathcal{E}/K$ for each test	Table D.7 (for t tests). Somewhat conservative, but applicable to any multiple-testing situation
HSD	SCI	no	$q_{\mathcal{E}}(g,\nu)/\sqrt{2}$	Table D.8. Exact method for testing all pairwise comparisons when ns are equal. Approximate when ns unequal
Scheffé	SCI	no	$\sqrt{(g-1)F_{\mathcal{E},g-1,\nu}}$	Exact method for exploring any and all possible contrasts. As such, it is maximally conservative. No matter what procedure you use, you never need a critical value higher than this one.
DSD	SCI	no	$d_{\mathcal{E}}(g-1,\nu)$	Table D.9. Limited family: control versus each treatment. There is also a one-sided version.
REGWR	SFER	yes	$q_{\mathcal{E}^*}(k,\nu)/\sqrt{2}$	For $k = g, g-1, \ldots$ Do not test sub-ranges unless enclosing range is significant. Use $\mathcal{E}^* = \mathcal{E}$ for $k = g$ or $g-1$, else $\mathcal{E}^* = k\mathcal{E}/g$. Table D.8 is limited; use software
Holm	SFER	yes	$p_{(j)} < \mathcal{E}/(K-j+1)$ for all $j = 1, 2, \ldots, i$	Criterion for ith test where $p_{(1)} \leq p_{(2)} \leq \cdots \leq p_{(K)}$ are ordered p values. Perform tests in order $i = 1, 2, \ldots, K$
SNK	FDR	yes	$q_{\mathcal{E}}(k,\nu)/\sqrt{2}$	Table D.8. For $k = g, g-1, \ldots$ Do not test sub-ranges unless enclosing range is significant. Exact method when ns are equal. Approximate when ns unequal
Benjamini & Hochberg	FDR	yes	$p_{(j)} < j\mathcal{E}/K$ for some $j \geq i$	Criterion for ith test where $p_{(1)} \leq p_{(2)} \leq \cdots \leq p_{(K)}$ are ordered p values. Perform tests in order $i = K, K-1, \ldots$ Requires independent tests.
Protected LSD	FER	no	$t_{\mathcal{E}/2,\nu}$	Perform all comparisons conditional on ANOVA F being significant at the $\mathcal{E}$ level (Table D.5)
LSD	CER	no	$t_{\mathcal{E}/2,\nu}$	Table D.3. This is just a standard t procedure

Tables are in reference to: Oehlert, G.W. (2010). *A First Course in Design and Analysis of Experiments*, New York: W.H. Freeman and Company.