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BONFERRONI-p a Visual-Basic program for the Bonferroni corrections of p-values.

by Ingo Schindler, Berlin

Part I

File: bonferroni-p.exe
a VisualBasic Program for Windows PCs

Part II

UserNotes

USER NOTES

DISCLAIMER

This VB-program is provided without any explicit or implicit warranty of correct functioning.

To use this program on your computer is your own risk. The program has been developed for my own research program. Researchers can use this program for scientific and research purposes, but intellectual property and copyright for the source code and program remains the property of Ingo Schindler.

Contact:

INGO SCHINDLER, 12051 Berlin

ingoschindler@web.de

1. Description

The Bonferroni correction is a method for the adjustment of p-values which are calculated from multiple tests.

There are two different methods available: (1) based on Holm (1979) with Hochberg's (1988) variation. It is described and explained in detail in Legendre & Legendre (1998: 18) and (2) Step-up FDR (Benjamini and Hochberg 1995) as it is described and explained by García (2004).

2. Input file

The file should be saved as ASCII *.txt, with no column or row headings.

Example (the notes in brackets are explanations and not part of the data file) :

10 [number of p-values]

0.041 0.762 .321 .034 .001 .008 .022 .463 .002 .008 [p-values]

3. Procedure

- a) Select input file (use drive-, directory- and file-box).
- b) Press 'DATA' if to load the file.
- c) Press 'Start' to start the calculation.
- d) Press 'Save' to store the results in a file (saved in the same directory shown in the directory-box).

- e) Press 'Show' to observe the results on the screen.
- f) Select new file to restart or press 'close' to terminate the program.

4. Test run

Using the data from the example above the following result is calculated.

the Bonferroni correction
 Results:
 adjusted p-values

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=====
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p	p'
0.041	0.164
0.762	0.762
0.321	0.762
0.034	0.164
0.001	0.01 *
0.008	0.056
0.022	0.132
0.463	0.762
0.002	0.018 *
0.008	0.056

Step-up FDR (Benjamini and Hochberg 1995)

- 0.001 **
- 0.002 **
- 0.008 *
- 0.008 *
- 0.022
- 0.034
- 0.041
- 0.321
- 0.463
- 0.762

* = $p < 0.05$; ** = $p < 0.01$

5. Notes

- 1) The program does not check the input file format. If it is not correct the program terminate automatically.
- 2) The program saves the results in the file with the name 'p-valuesX'

(x=number of runs in the current session). The program don't check if this file exists. Thus, it may happen that your old data file is deleted.

6. Literature

GARCÍA, L. V. 2004. Escaping the Bonferroni iron claw in ecological studies. *Oikos* 105: 657-663.

LEGENDRE, P. & L. LEGENDRE. 1998. *Numerical Ecology*. Elsevier, Amsterdam.

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NOTE: If you find bugs or mistakes in this program, please contact me immediately! Any help and suggestions are welcome.

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Appendix:

Procedure for the "Step-up FDR" (adopted from Gracia 2004: 659). p-values are ranked in ascending order, j being the resulting rank. Proceed from $j=n$ to $j=1$, until finding a first p-value, ranked k, satisfying $p_k < k * \alpha / n$ or $p_k = k * \alpha / n$. Then reject H_j for $j < k$ or $j = k$ and accept all the remaining null hypotheses.