double phase to $t = 3$, whereas in the original SSA-I program $t = 10$, and in subsequent programs Lingoes (1973) set $t = 5$. We have found (on the basis of brief informal experimentation) that $t = 3$ improves speed and efficiency at the cost of only a small number of additional double-phase iterations.

Restrictions. The most meaningful restriction on APLIMDA is the response time (not the CPU time) that the user is willing to accept. Unless the IBM 360 user is in a position to use a privileged terminal (or devise a method for inducing this state), the user will often have to wait 60 sec for each iteration with a 25-order matrix on the IBM 360/65. However, since the program is interactive, the user is in a position to quickly determine (with very few iterations) the most appropriate dimensionality for the data set presently under analysis.

Program Availability. Program listings of APLIMDA are available from James E. Dannemiller, Acting Director, Survey Research Office, 1914 University Avenue, The University of Hawaii, Honolulu, Hawaii 96822. With the listing (which is free of charge), we provide a trial matrix together with the correct output.

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Probabilities for Spearman rank correlation coefficients*

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Spearman's rank correlation procedure (Spearman, 1904; Zar, 1974, pp. 243-244) is one of the oldest and

best known of nonparametric methods. This program may be used alone or employed with a rank correlation program. It provides the one-tailed and two-tailed probabilities of given Spearman rank correlation coefficients.

Input. Any number of Spearman rank correlation coefficients, r_s , and their associated sample sizes.

Output. The probability (both one-tailed and two-tailed) of a Spearman rank correlation coefficient at least as large as each coefficient submitted.

This program is especially useful as a subroutine in conjunction with programs (e.g., Zar, 1970) for Spearman rank correlation analysis.

Method. For the Spearman rank correlation coefficient,

$$r_s = 1 - 6 \Sigma d^2 / (n^3 - n),$$

the value of Σd^2 is computed. Then the cumulative probability for all possible Σd^2 up to and including the computed Σd^2 is determined by the Pearson Type II curve approximation described by Olds (1938, 1949). This approximation is very accurate for moderate and large sample sizes and is much more accurate than employing Student's t for assessing the significance of the rank correlation coefficient (Zar, 1972). When dealing with small sample sizes, however (say, less than 10), it might be wiser to refer to tables of the exact distribution of Σd^2 (Owen, 1962, pp. 400-406; de Jonge & von Montfort, 1972; Otten, 1973) or to tables of critical values of r_s (Zar, 1974, pp. 498-499).

Program Language and Computer. This program is written in FORTRAN IV and was run on the Northern Illinois University IBM 360/67 system, utilizing 82K bytes of core for compilation.

Availability. A source program listing and documentation may be obtained without cost from: Jerrold H. Zar, Department of Biological Sciences, Northern Illinois University, DeKalb, Illinois 60115.

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