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Dr. R. A. Fisher
University College
University of London
London

Dear Dr. Fisher:

Having used the z-transformation quite extensively in the last few years, I feel there is an advantage in a sister table to your TABLE VB, with r as the argument. Some time ago I computed such a table to facilitate my own work. It proved to be quite serviceable. I distributed a few copies of it among some of my friends-statisticians, who advise me to give it a wider circulation by publishing it in some periodical.

Since this is your own original subject, I would like your comment on this new table. Do you think it worth while to publish it?

Sincerely yours,

Marc J. Feldstein

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Incl.

TABLE OF z , FOR VALUES OF r FROM 0.01 TO 1.00

by

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The z-transformation of the coefficients of correlation was suggested by R. A. Fisher, who discussed its theoretical and practical advantages. *)

The formulae for this transformation are:

$$r = \frac{e^{2z} - 1}{e^{2z} + 1} \qquad (I)$$

$$z = \frac{1}{2}\left\{\log_e(1 + r) - \log_e(1 - r)\right\} \qquad (II)$$

To facilitate the use of this transformation Fisher gives the TABLE OF r , FOR VALUES OF z FROM 0 TO 3. (TABLE VB) **)

To find the value of z for a given value of r, the cumbersome procedure of inverse interpolation is used. To obviate this, we have computed a sister table to Fisher's TABLE V B . The argument of our table is r , by one hundredths. The corresponding values of z are given to four decimal places.

No interpolation is needed to find the value of z corresponding to the value of r given to two decimal places. If the value of r is given to more than two places, one may readily determine z by means of direct linear interpolation.

When a calculating machine is available, the following procedure may be used:

EXAMPLE I. Find the value of z for r = -.629 . We find from our table that z lies between .7250 and .7414. To find the value of z , multiply .7414 by .9 and .7250 by .1, cumulating the products. The final value of z = -.73976 or -.7398 , when rounded up to four decimal places. This value is identical with a one given by Fisher. ***)

EXAMPLE II. Find z for r = .7267 . Using exactly the same procedure, cumulating the products: .9287 x .67 and .9076 x .33 , one obtains the final value of z = .921737. ****)

This TABLE OF z , FOR VALUES OF r FROM 0.01 TO 1.00 is computed by substituting all the respective values of the argument in the formula (II). A table of natural logarithms to six places was used. Each tabular value was then checked by the inverse interpolation of the values of tanh from the Smithsonian Mathematical Tables. *****)

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*) Fisher, R.A., Statistical Methods for Research Workers, Fourth Ed. Oliver and Boyd 1932 pp 175 - 185

**) op. cit. p. 189

***) op. cit. p. 180

****) OP. CIT. p. 183 cf. with value .9218 TABLE 35.

*****) Becker, G. E. and VanOrstrand, C.E. Hyperbolic Functions, Smithsonian Institution, 1909.

TABLE OF z , FOR VALUES OF r FROM 0.01 TO 1.00

$$z = \frac{1}{2}\left\{\log_e(1+r) - \log_e(1-r)\right\}$$

r	.01	.02	.03	.04	.05	.06	.07	.08	.09	.10
.0	.0100	.0200	.0300	.0400	.0500	.0601	.0701	.0802	.0902	.1003
.1	.1104	.1206	.1307	.1409	.1511	.1614	.1717	.1820	.1923	.2027
.2	.2132	.2237	.2342	.2448	.2554	.2661	.2769	.2877	.2986	.3095
.3	.3205	.3316	.3428	.3541	.3654	.3769	.3884	.4001	.4118	.4236
.4	.4356	.4477	.4599	.4722	.4847	.4973	.5101	.5230	.5361	.5493
.5	.5627	.5763	.5901	.6042	.6184	.6328	.6475	.6626	.6777	.6931
.6	.7089	.7250	.7414	.7582	.7753	.7928	.8107	.8291	.8480	.8673
.7	.8872	.9076	.9287	.9505	.9729	.9962	1.0203	1.0454	1.0714	1.0986
.8	1.1270	1.1568	1.1881	1.2212	1.2561	1.2934	1.3333	1.3758	1.4219	1.4722
.9	1.5275	1.5890	1.6584	1.7380	1.8318	1.9459	2.0923	2.2975	2.6467	∞