87[K].—MINORU SIOTANI & MASARU OZÄWA, "Tables for testing the homogeneity of k independent binomial experiments on a certain event based on the range," *Ann. Inst. Stat. Math.*, v. 10, 1958, p. 47–63.

Let k series of N trials each of a certain event be performed with the outcome of ν_i occurrences in the i-th series in which the fixed probability of occurrence was p_i, $i = 1, 2, \cdots, k$. To test the null hypothesis of homogeneity:

$$p_1 = p_2 = \cdots = p_k = p,$$

Siotani had previously proposed the statistic, $R_k(N, p)$, the range of the ν_i [1]. The tables in this paper give for $N = 10(1)20, 22, 25, 27, 30$; $k = 2(1)15$;

$$p = .1(.1).5;$$

$\alpha = .001, .005, .01(.01).06, .08, .1$, the greatest r_k for which

$$\Pr\{R_k(N, p) \geqq r_k\} < \alpha + .0005.$$

The cases in which for the r_k given, $\alpha < \Pr\{R_k(N, p) \geqq r_k\} < \alpha + .0005$ or

$$\alpha - .005 < \Pr\{R_k(N, p) \geqq r_k\} < \alpha$$

are indicated by attaching a + or a − respectively to the value of r_k.

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1. MINORU SIOTANI, "Order statistics for discrete case with a numerical application to the binomial distribution," *Ann. Inst. Stat. Math.*, v. 8, 1956, p. 95–104.

88[K].—P. N. SOMERVILLE, "Tables for obtaining non-parametric tolerance limits," *Ann. Math. Stat.*, v. 29, 1958, p. 599–601.

Let P be the fraction of a population having a continuous but unknown distribution function that lies between the r-th smallest and the s-th largest values in a random sample of n drawn from that population. Then for any $r, s \geqq 0$ such that $r + s = m$, Table I gives the largest value of m such that with confidence coefficient $\geqq \gamma$ we may assert that $100P\%$ of the population lies in the interval (r, s) for $\gamma = .5, .75, .9, .95, .99$ and $n = 50(5)100(10)150, 170, 200(100)1000$. Table II gives γ to 2D for the assertion that $100P\%$ of the population lies within the range, $(r, s = 1)$, in a sample of n for $P = .5, .75, .9, .95, .99$ and

$$n = 3(1)20, 25, 30(10)100.$$

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89[K].—G. P. STECK, "A table for computing trivariate normal probabilities," *Ann. Math. Stat.*, v. 29, 1958, p. 780–800.

Let X, Y, Z be standardized random variables obeying a trivariate normal distribution law. The author finds Pr $(X \leqq h, Y \leqq k, Z \leqq m)$ in terms of three functions:

$$G(x) = (2\pi)^{-1/2}\int_{-\infty}^{x} \exp\left(-\frac{x^2}{2}\right) dx, \qquad T(h, a)$$

$$= (2\pi)^{-1} \int_0^a [\exp\{-h^2(1 + x^2)/2\}](1 + x^2)^{-1}\, dx,$$

and

$$S(h, a, b) = \int_{-\infty}^{h} T(as, b)G'(s)\, ds.$$

The T-function has been tabulated by D. B. Owen [1, 2] and a table of $S(m, a, b)$ is given in the present paper to 7D for $a = 0(.1)2(.2)5(.5)8$, $b = .1(.1)1$ and a range of values of m decreasing from $0(.1)1.5$, ∞ for $a = 0(.1)1.2$ to $0(.1).3$, ∞ for $a = 6(.5)8$. The tabulated values are believed accurate to 0.6 in the seventh decimal place. There is considerable discussion of the main problem, of properties of and relations among the functions used, and a numerical example is worked out. The method of construction of the table is given and the efficacy of linear interpolation in it is discussed.

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1. D. B. OWEN, *The Bivariate Normal Probability Distribution*, Office of Technical Services, Department of Commerce, Washington, D. C., 1957, [*MTAC* Review 134, v. 12, 1958, p. 285–286.]

2. D. B. OWEN, "Tables for computing bivariate normal probabilities," *Ann. Math. Stat.*, v. 27, 1956, p. 1075–1090. [*MTAC* Review 135, v. 12, 1958, p. 286.]

90[K].—G. TAGUTI, "Tables of tolerance coefficients for normal populations," Union of Japanese Scientists and Engineers, *Reports of Statistical Application Research*, v. 5, 1958, p. 73–118.

The tolerance limits T_1, T_2 are to be determined so that with probability $1 - \alpha$ the interval (T_1, T_2) includes a given fraction, P, of the population. Following the method of Wald & Wolfowitz [1] for a sample from $N(\mu, \sigma^2)$, T_1 and T_2 are found by $T_1 = \hat{\mu} - k\sqrt{S_e/\nu}$ and $T_2 = \hat{\mu} + k\sqrt{S_e/\nu}$, in which $\hat{\mu}$ is an unbiased estimate of μ with variance σ^2/n and S_e is an independent error sum of squares with ν degrees of freedom. As illustrated by the author this permits useful applications in which n is not simply the sample size and $\nu = n - 1$ as is the case for the tables of Bowker [2]. The present tables give k to 3S for $P = .9, .95, .99$, $1 - \alpha = .9, .95, .99$, $n = .5(.5)2(1)10(2)20(5)30(10)60(20)100, 200, 500, 1000, \infty$ and $\nu = 1(1)20(2)30(5)100(100)1000, \infty$. The calculations were done with a slide rule and the author fears there may be errors up to one per cent. Some cursory comparisons with Bowker's tables for $\nu = n - 1$ showed frequent differences in the third significant figure.

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