c_q is the number of classes of elements of order q in G, then not more than min c_q orthogonal squares can be constructed from G by the automorphism method. (Received September 30, 1942.)

337. Abraham Wald: *On a statistical problem arising in the classification of an individual in one of two groups.*

Let π_1 and π_2 be two p-variate normal populations which have a common covariance matrix. A sample of size N_i is drawn from the population π_i $(i=1, 2)$. Denote by $x_{i\alpha}$ the αth observation on the ith variate in π_1, and by $y_{i\beta}$ the βth observation on the ith variate in π_2. Let z_i $(i=1, \cdots, p)$ be a single observation on the ith variate drawn from a population π where it is known that π is equal either to π_1 or to π_2. The parameters of the populations π_1 and π_2 are assumed to be unknown. It is shown that for testing the hypothesis $\pi=\pi_1$ a proper critical region is given by $U\geqq d$ where $U=\sum\sum s^{ij}z_i(\bar{y}_j-\bar{x}_j)$, $\|s^{ij}\|=\|s_{ij}\|^{-1}$, $s_{ij}=[\sum_\alpha(x_{i\alpha}-\bar{x}_i)(x_{j\alpha}-\bar{x}_j)+\sum_\beta(y_{i\beta}-\bar{y}_i)(y_{j\beta}-\bar{y}_j)]/(N_1+N_2-2)$, $\bar{x}_i=(\sum_\alpha x_{i\alpha})/N_1$, $\bar{y}_i=(\sum_\beta y_{i\beta})/N_2$ and d is a constant. The large sample distribution of U is derived and it is shown that U is a simple function of three angles in the sample space whose exact joint sampling distribution is derived. (Received August 7, 1942.)

338. Jacob Wolfowitz: *On the consistency of a class of non-parametric statistics.*

Let X and Y be two stochastic variables about whose distribution nothing is known except that they are continuous and let it be required to test whether their distribution functions are the same. Let V be the observed sequence of zeros and ones constructed as described elsewhere (Wald and Wolfowitz, Annals of Mathematical Statistics, vol. 11 (1940), p. 148). Suppose that the statistic $S(V)$ used to test the hypothesis is of the form $S(V)=\sum\phi(l_j)$, where l_j is the length of the jth run and $\phi(x)$ a suitable function defined for all positive integral x. The notion of consistency, originated by Fisher for parametric problems, has already been extended to the non-parametric case (loc. cit., p. 153). The author now proves that, subject to reasonable conditions on $\phi(x)$ and statistically unimportant restrictions on the alternatives to the null hypothesis, statistics of the type $S(V)$ are consistent. In particular, a statistic discussed by the author (Annals of Mathematical Statistics, vol. 12 (1942)) and for which $\phi(x)=\log(x^x/x!)$ belongs to the class covered by the theorem. (Received August 7, 1942.)

Topology

339. O. G. Harrold: *A higher dimensional analogue of a theorem of plane topology.*

Since the carriers of a Vietoris cycle may have a dimensionality far removed from that of the cycle, it is of interest to determine a class of spaces for which the bounding cycles have membranes of dimensionality exceeding that of the cycle by unity. An example is known of an $1c^1$ carrying an essential 1-cycle which has a 1-dimensional carrier but bounds only on a 3-dimensional set. A similar example is constructed in the Euclidean space E_6. That such cannot happen in certain Euclidean spaces is indicated by the following theorem, which is a generalization of a known result for $n=0$. Let X be a compact $1c^n$ subset of E_{n+2}. Denote by F the frontier of X relative to E_{n+2}. There exists in X a compact subset X_0 which is $1c^n$ such that $X_0\supset F$ and $\dim X_0\leqq n+1$. (Received August 4, 1942.)