47. Henry Scheffé: *A note on the Behrens-Fisher problem.*

Let $(x_1, \cdots, x_m)$ and $(y_1, \cdots, y_n)$ be samples from two normal universes. The problem is the comparison of the means of the universes when the ratio of their variances is unknown. Solutions based on the t-distribution were studied in a previous paper (Annals of Mathematical Statistics vol. 14 (1943) pp. 35–44), and a very convenient one was singled out. This, however, did not have the desirable "symmetry" property, that is, invariance under permutations of the x's among themselves and of the y's among themselves. This note outlines a proof that there exists no "symmetric" solution based on the t-distribution. (Received October 26, 1944.)

Topology

48. L. M. Blumenthal: *Generalized elliptic spaces and quadratic forms.*

Continuing his study of generalized elliptic spaces (abstract 49-11-304) the writer obtains quadratic form theorems concerning invariance of rank under sign changes of coefficients. Thus, for example, if a quadratic form in more than three variables, with the coefficients of the squared terms 1 and those of the products x_ix_j $(i<j)$ between -1 and 1, is positive definite of rank 2, then each positive definite form obtained by a change of sign of coefficients of terms x_ix_j is also of rank 2. The "natural" extension of this theorem to forms in more than four variables with rank 3 is not valid. By investigating the different kinds of equilateral sets contained in n-dimensional elliptic space, the writer shows that these spaces have neither congruence order $n+3$ nor $n+4$ (except for $n=1$). Since, for example, the ordinary elliptic plane contains an equilateral 6-point it failed to have congruence order 6. (Received October 23, 1944.)

49. R. H. Fox: *An application of the complete homotopy group.*

The fundamental group $\tau_n(Y)=\pi_1(Y^T)$ of the space of continuous mappings of the $(n-1)$-dimensional torus $T=T_{n-1}$ into a topological space Y was introduced in a previous communication (abstract 49-11-306). J. H. C. Whitehead has proved two theorems (Proc. London Math. Soc. (2) vol. 45 (1939) p. 281 and Ann. of Math. vol. 42 (1941) p. 418) about homotopy groups. When these are combined and restated in terms of the groups τ_n the result is as follows: Let K^* be a complex and let K be a complex obtained from K^* by removing the interior $\sigma-\dot{\sigma}$ of a principal n-dimensional simplex σ, where $n>2$. The nucleus of the injection homomorphism $\tau_n(K)\rightarrow\tau_n(K^*)$ is precisely the invariant subgroup of $\tau_n(K)$ which is generated by the image of the injection homomorphism $\tau_n(\dot{\sigma})\rightarrow\tau_n(K)$. This reformulation seems to have more intuitive content and suggests an attack on the harder problem where dim $\sigma>n$. (Received October 28, 1944.)

50. R. H. Fox: *On topologies for function spaces.*

To be useful a topology for the set F of continuous functions from X to Y should have one or more of the following properties: (1) A function from $X\times T$ to Y is continuous if and only if the corresponding function from T to F is continuous. (2) The sectioning operation to or from F is continuous. (3) The function $\phi(x, f)=f(x)$ from $X\times F$ to Y is continuous. For any compact set $A\subset X$ and open set $W\subset Y$ let $M(A, W)$ denote the set of continuous functions $f\in F$ such that $f(A)\subset W$. The topology determined by the subbasis $\{M(A, W)\}$ satisfies (1) and (2) if $X\times T$ is separable Hausdorff. If X is normal but not locally compact and Y is an arc, no topology satisfies both (1) and (3). (Received October 21, 1944.)