corresponding probabilities be equal respectively to $k_i dt+o(dt)$ and $g_i dt+o(dt)$ where $k_{n+1}\geqq 0$, the remaining constants k_i being all greater than 0 and either independent of i or forming an arithmetic progression. Let g_i be either 0 or a constant $g>0$. If $g_m=0$ for a certain $m\leqq n-2$ then $P_{1,n}(t)$ is the convolution of $P_{1,m}(t)$ and $P_{m+1,n}(t)$. This reduces the calculation of $P_{1,n}(t)$ to the case when all g_i's are not equal to 0, and $P_{1,n}(t)$ is obtained in this case as a power series in g whose coefficients are expressed in terms of the functions specified in the title of this abstract. The paper is a part of two articles to be published in vol. 8 (1946) of the Bulletin of Mathematical Biophysics. (Received October 1, 1945.)

Topology

245. R. H. Bing: *Collections cutting the plane.*

The following is proved for the plane: Suppose that K is a bounded set of n components which does not cut the point A from the point B, that G is a collection of compact continua with a closed sum, that the sum of no n elements of G cuts A from B in the complement of K and that no two elements of G intersect each other in the complement of $\bar{K}$ but each element of G intersects $\bar{K}$. Then the sum of the elements of G does not cut A from B in the complement of K. Also, there is a subset T of $\bar{K}-K$ irreducible with respect to $\bar{K}-T$ not cutting A from B and such that if the components of T are regarded as points, there is an arc (or a point) in the complement of $\bar{K}-T$ that contains A and B but no point of an element of G. (Received September 4, 1945.)

246. D. G. Bourgin: *Quadratic forms.*

This note gives a topological interpretation of the two numerical invariants characterizing a real quadratic form, namely the rank and the signature. Thus for Q (not definite) in $n+1$ essential variables the signature is $n+2-\sum_0^n R_j$ where R_j is the j-dimensional mod 2 Betti number of the configuration $Q=0$ in $(n+1)$-dimensional projective space. The case of definite forms is included by either identifying rank and signature here or by using $Q'=Q+x_{-1}^2-x_{-2}^2$. The appearance of the sum rather than the alternating sum of the Betti numbers is interesting. The invariant above may be taken as a definition of the signature for more general forms, and presumably other numerical invariants needed for more general forms may be introduced in a natural way by taking account of the topological aspects of the manifolds corresponding to $Q=0$. (Received September 22, 1945.)

247. W. H. Gottschalk: *Properties of minimal sets.*

Let X be a topological space in which there operates a *flux*, that is, a homeomorphism, a mapping, a one-parameter group of transformations, or a one-parameter semi-group. A subset of X is *minimal* in the sense of G. D. Birkhoff provided that it is a smallest orbit-closure. It is shown that a minimal-set partition carries over from a flux to a sub-flux. Minimality is characterized. The existence of minimal sets is demonstrated in case the phase space X is compact. Finally, it is proved that if X is a compact Hausdorff space, if f is a continuous flux, and if X is minimal under f, then either X is minimal under every sub-flux or X is the cartesian product, with bases properly identified, of the unit interval and a set minimal under some sub-flux. It is to be noted that minimal sets and almost periodicity are intimately related. (Received August 8, 1945.)

248. W. H. Gottschalk: *Topological characterizations of almost periodicity.*

The author generalizes previous results of his (see *Orbit-closure decompositions and almost periodic properties*, Bull. Amer. Math. Soc. vol. 50 (1944) pp. 915–919) to include nonmetric spaces and to include homeomorphisms, mappings, one-parameter transformation groups and one-parameter semi-groups. It is noted that an almost periodic function may be considered as an almost periodic point in a function space. Bochner's characterization of almost periodicity is extended to the cases of a homeomorphism and a one-parameter group in a uniform space. Several uses of these theorems are made to obtain further results. (Received August 8, 1945.)

249. William Gustin: *Countable connected spaces.*

Let $\mathfrak{S}$ be the class of all countable and connected perfectly separable Hausdorff spaces containing more than one point. Urysohn, using a complicated identification of points, has constructed an $\mathfrak{S}$ space (Math. Ann. vol. 94 (1925) pp. 274–283). Two $\mathfrak{S}$ spaces, X and X^*, more simply constructed and not involving identifications, will be presented. The space X^* is a connected subspace of X and contains a dispersion point; that is, the subspace formed from X^* by removing this one point is totally disconnected. (Received July 17, 1945.)

250. Deane Montgomery: *Measure preserving homeomorphisms.*

Kerékjártó has obtained interesting results on a class of transformations which he named similitudes (C. R. Acad. Sci. Paris vol. 198 (1934) pp. 1345–1347). By modifying his method one can obtain certain results about the structure of measure preserving homeomorphisms in the vicinity of fixed points. It is shown that there must be arbitrarily small (but not degenerate) continua containing the fixed point and going into themselves under the transformation. This implies that there are points near the fixed point which remain near under positive iteration. (Received August 10, 1945.)

251. Deane Montgomery and Hans Samelson: *Fiberings with singularities.*

A mapping P of a polyhedron R onto a polyhedron B is called a singular fiber mapping if (1) P is open, (2) P is topological on a closed subset L of R, and (3) P is a fiber mapping (in the sense of Hurewicz-Steenrod) of the complement of L. The points of L are the singularities. It is proved that a (differentiable) singular fibering of an n-sphere cannot have exactly one singular point, and that, if the fiber has characteristic 0 and the singular points are finite in number, there are exactly 0 or 2, depending on the parity of n. (Received August 27, 1945.)

NEW PUBLICATIONS

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