3. ———, *The Riemann-Roch theorem for analytic embeddings*, Topology 1 (1962), 151–166.
4. A. Borel and J.-P. Serre, *Le théorème de Riemann-Roch (d'après Grothendieck)*, Bull. Soc. Math. France **86** (1958), 97–136.
5. E. Dyer, *Relations between cohomology theories*, Aarhus Colloquium on Algebraic Topology, 1962; pp. 89–93.
6. B. Eckmann, *Cohomology of groups and transfer*, Ann. of Math. (2) **58** (1953), 481–493.
7. ———, *On complexes with operators*, Proc. Nat. Acad. Sci. U.S.A. **39** (1953), 35.
8. M. Hall, Jr., *Theory of groups*, Macmillan, New York, 1959.

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ISOMORPHIC COMPLEXES

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In this paper we show that if K and L are n-complexes, then K and L are isomorphic iff the 1-sections of the first derived complexes of K and L are isomorphic. This provides a low-dimensional method for establishing the isomorphism (homeomorphism) of complexes (polyhedra).

Throughout, s_p will denote a (rectilinear) p-simplex with vertices $a^0, a^1, \cdots, a^p$; K will denote a (finite geometric) complex with n-section K^n and first derived complex K'. The *closed star* of a vertex a of K, st(a), is the set of simplexes of K having a as a face and all their faces. For more details see [2].

DEFINITION 1. An n-complex K is *full* provided, for any subcomplex L of K which is isomorphic to s_p^1, $2 \leqq p \leqq n$, L^0 spans a p-simplex of K.

THEOREM 1. *Suppose K and L are full n-complexes. Then K and L are isomorphic iff K^1 and L^1 are isomorphic.*

PROOF. We need only consider the case when K^1 and L^1 are isomorphic. Let $v: K^1 \rightarrow L^1$ be an admissible vertex transformation of K^1 onto L^1 with an admissible inverse. Then a^0, a^1 span a 1-simplex of K iff $v(a^0)$, $v(a^1)$ span a 1-simplex of L. Furthermore, for any p, $2 \leqq p \leqq n$, if $a^0, a^1, \cdots, a^p$ span a p-simplex s_p of K, then $v[s_p^1]$ is isomorphic to s_p^1. So, using the fullness of L, we get that $(v[s_p^1])^0$

$= \{v(a^0),\ v(a^1), \cdots, v(a^p)\}$ spans a p-simplex of L. Similarly, if $\{v(a^0), v(a^1), \cdots, v(a^p)\}$ spans a p-simplex of L, then $\{a^0, a^1, \cdots, a^p\}$ spans a p-simplex of K. Hence, v is an admissible vertex transformation of K onto L with an admissible inverse and so K and L are isomorphic.

LEMMA 1. *If K is an n-complex, then K' is a full n-complex.*

PROOF. Suppose L is a subcomplex of K' and L is isomorphic to s_p^1, $2 \leqq p \leqq n$. Then there is a barycenter b of a q-simplex of K, $p \leqq q \leqq n$, such that $L \subset \text{st}(b)$. Hence L^0 spans a p-simplex of K.

THEOREM 2. *If K and L are n-complexes, then K and L are isomorphic iff $(K')^1$ and $(L')^1$ are isomorphic.*

PROOF. Suppose K and L are isomorphic. Then K' and L' are isomorphic n-complexes. Since they are both full (Lemma 1) we can apply Theorem 1 to get that $(K')^1$ and $(L')^1$ are isomorphic.

Now assume that $(K')^1$ and $(L')^1$ are isomorphic. Then Theorem 1 implies K' and L' are isomorphic and so K and L are isomorphic (see [1]).

REFERENCES

1. R. L. Finney, *The insufficiency of barycentric subdivision*, Notices Amer. Math. Soc. 10 (1963), 668; Michigan Math J. (to appear).

2. P. J. Hilton and S. Wiley, *Homology theory*, Cambridge Univ. Press, Cambridge, 1960.

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