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Andrews-Curtis operations and higher commutators of the relator group. (Andrews-Curtis-Operationen und höhere Kommutatoren der Relatorengruppe.) (German) Zbl 0742.57002

J. Pure Appl. Algebra 75, No. 1, 37-45 (1991).

J. H. C. Whitehead proved that, given two n -dimensional ($n > 2$) simple-homotopy equivalent polyhedra, there exists an $n + 1$ -dimensional polyhedron which collapses to both of the given ones. For $n = 2$ the question is essentially group-theoretic: it is known that 2-complexes which are simple-homotopy equivalent may be 3-deformed to certain standard complexes having presentations with an equal number of defining relators and the same relator subgroup N . Indeed, corresponding relators R_i, S_i differ by an element of the commutator subgroup $N^{(1)}$ (i.e. $R_i \cdot S_i^{-1} \in N^{(1)}$). A result analogous to that of Whitehead for $n = 2$ boils down to deciding whether one set of relators may be carried to the other via a sequence of certain (Andrews-Curtis) operations. In this paper a step is taken along this route by showing that for two presentations as above, there exist operations which provide the generalized relationship between transformed relators $R_i \cdot S_i^{-1} \in N^{(n)}$ for any n (where $N^{(n)}$ is the n th derived group of N). The long-term goal is to understand the operations for various n in sufficient detail to ensure the eventual vanishing of the commutator ‘difference terms’.

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MSC:

57M20 Two-dimensional complexes (manifolds) (MSC2010)

57Q10 Simple homotopy type, Whitehead torsion, Reidemeister-Franz torsion, etc.

57M05 Fundamental group, presentations, free differential calculus

Keywords:

Andrews-Curtis operations; 2-complexes; simple-homotopy equivalent; presentations; defining relators; relator subgroup; commutator subgroup

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