63. *On the Spaces of Self Homotopy Equivalences of Certain CW Complexes*

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1. Introduction. Let X be a connected CW complex with base point which is a vertex of X. And let $G(X)$ and $G_0(X)$ be the space of self homotopy equivalences of X with the compact open topology and the space (subspace of $G(X)$) of self homotopy equivalences of X preserving the base point, respectively. When X is an Eilenberg-MacLane complex $K(\pi, \mathrm{n})$, the weak homotopy type of $G(X)$ and $G_0(X)$ are completely determined by R. Thom [4] and D. H. Gottlieb [1], but it seems that little is known about the homotopy type of $G(X)$ and $G_0(X)$.

2. Results. Now, let X and Y be connected locally finite CW complexes with base points. Then there exists the following homeomorphisms (see [3]),

$$(X\times Y)^{X\times Y}\cong X^{X\times Y}\times Y^{X\times Y}\cong (X^X)^Y\times (Y^Y)^X,$$

$$(X\times Y)_0^{X\times Y}\cong X_0^{X\times Y}\times Y_0^{X\times Y}=(X^X, X_0^X)^{(Y,y_0)}\times (Y^Y, Y_0^Y)^{(X,x_0)},$$

where Z_0^K denotes the space of maps of K to Z preserving the base points with the compact open topology, $(Z, Z')^{(K,L)}$ denotes the space of maps of (K, L) to (Z, Z') and $(Z, Z')^{(K,L)}$ is regarded as a subspace of Z^K. Under these correspondences we have the following two theorems.

Theorem 1. *Let X and Y be connected locally finite CW complexes with base points. For given $n>0$, assume that $\pi_i(X)=0$ for every $i>n$ and $\pi_i(Y)=0$ for every $i\leqq n$. Then we have*

$$G(X\times Y)=G(X)^Y\times G(Y)^X,$$

$$G_0(X\times Y)=(G(X), G_0(X))^{(Y,y_0)}\times (G(Y), G_0(Y))^{(X,x_0)}.$$

Theorem 2. *For given $n>0$, let X be a connected locally finite CW complex with base point whose dimension is not greater than n and let Y be an n-connected locally finite CW complex with base point. Then the same formulas on $G(X\times Y)$ and $G_0(X\times Y)$ as in Theorem 1 hold.*

These theorems are obtained by considering the induced homomorphisms of homotopy groups of self map of $(X\times Y, (x_0, y_0))$.

Let X be a connected locally finite CW complex with base point. Then every arcwise connected component of $G(X)$ has the same homotopy type. The same fact holds for $G_0(X)$. More generally, we have