GENERALIZED EVALUATION SUBGROUPS
OF HOMOTOPY GROUPS AND
THEIR LOCALIZATIONS

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D. H. Gottlieb has defined and studied the evaluation subgroups $G_n(X)$ of the homotopy groups $\pi_n(X)$ of a topological space X. Moreover G. E. Lang, Jr., J. Siegel and many authors have studied these subgroups.

The subgroup $G_n{}^f(X, A)$ of $\pi_n(X)$ defined by

$$G_n{}^f(X, A) = \mathrm{Im}(\omega_* : \pi_n(X^A, f) \longrightarrow \pi_n(X, *))$$

is a generalization of the evaluation subgroup $G_n(X)$, where $\omega : X^A \longrightarrow X$ is the evaluation map from the function space X^A with compact-open-topology into the space X.

The purpose of the present thesis is to study the subgroup $G_n{}^f(X, A)$.

In chapter I, we investigate the properties of the group $G_n{}^f(X, A)$ and generalize the properties of $G_n(X)$.

In chapter II, we study the localization of the group $G_n{}^f(X, A)$ for each prime p or 0 and generalize the results of G. E. Lang, Jr. Moreover we obtain the relationships between $G_n{}^f(X, A)$ and the genus of the map f.

In the final chapter, we introduce functors from the category of pointed (based) spaces with pointed (base-point-preserving) maps to the categories of semilattices and complete semilattices with homomorphisms respectively.

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