
Summary: By generalizing the whisker topology on the $n$th homotopy group of pointed space $(X, x_0)$, denoted by $\pi_\text{wh}^n(X, x_0)$, we show that $\pi_\text{wh}^n(X, x_0)$ is a topological group if $n \geq 2$. Also, we present some necessary and sufficient conditions for $\pi_\text{wh}^n(X, x_0)$ to be discrete, Hausdorff and indiscrete. Then we prove that $L_n(X, x_0)$ the natural epimorphic image of the Hawaiian group $H_n(X, x_0)$ is equal to the set of all classes of convergent sequences to the identity in $\pi_\text{wh}^n(X, x_0)$. As a consequence, we show that $L_n(X, x_0) \cong L_n(Y, y_0)$ if $\pi_\text{wh}^n(X, x_0) \cong \pi_\text{wh}^n(Y, y_0)$, but the converse does not hold in general, except for some conditions. Also, we show that on some classes of spaces such as semilocally $n$-simply connected spaces and $n$-Hawaiian like spaces, the whisker topology and the topology induced by the compact-open topology of $n$-loop space coincide. Finally, we show that $n$-SLT paths can transfer $\pi_\text{wh}^n$ and hence $L_n$ isomorphically along its points.

MSC:

55Q05 Homotopy groups, general; sets of homotopy classes
55Q20 Homotopy groups of wedges, joins, and simple spaces
55P65 Homotopy functors in algebraic topology
55Q52 Homotopy groups of special spaces

Keywords:

Whisker topology; Hawaiian group; $n$-dimensional Hawaiian earring; harmonic archipelago

Full Text: DOI

References:


10 P. Fabel, Multiplication is discontinuous in the Hawaiian Earring group (with the Quotient Topology), Bull. Pol. Acad. Sci. Math. 59 (1), 77-83, 2011. - Zbl 1229.54046


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.