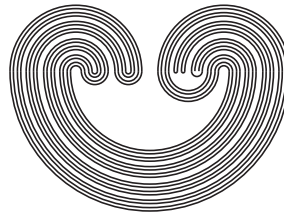


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TOPOLOGY PROCEEDINGS



Volume 49, 2017

Pages 41–64

<http://topology.nipissingu.ca/tp/>

STRAIGHT HOMOTOPY INVARIANTS

by

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Electronically published on April 28, 2016

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E-mail: topolog@auburn.edu

ISSN: (Online) 2331-1290, (Print) 0146-4124

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STRAIGHT HOMOTOPY INVARIANTS

SEMËN PODKORYTOV

ABSTRACT. Let X and Y be spaces and M be an abelian group. A homotopy invariant $f: [X, Y] \rightarrow M$ is called straight if there exists a homomorphism $F: L(X, Y) \rightarrow M$ such that $f([a]) = F(\langle a \rangle)$ for all $a \in C(X, Y)$. Here $\langle a \rangle: \langle X \rangle \rightarrow \langle Y \rangle$ is the homomorphism induced by a between the abelian groups freely generated by X and Y and $L(X, Y)$ is a certain group of “admissible” homomorphisms. We show that all straight invariants can be expressed through a “universal” straight invariant of homological nature.

1. INTRODUCTION

We define straight homotopy invariants of maps and give their characterization, which reduces them to the classical homology theory.

The group $L(X, Y)$. For a set X , let $\langle X \rangle$ be the (free) abelian group with the basis $X^\# \subseteq \langle X \rangle$ endowed with the bijection $X \rightarrow X^\#, x \mapsto \langle x \rangle$. For sets X and Y , let $L(X, Y) \subseteq \text{Hom}(\langle X \rangle, \langle Y \rangle)$ be the subgroup generated by the homomorphisms u such that $u(X^\#) \subseteq Y^\# \cup \{0\}$. (Elements of $L(X, Y)$ are the homomorphisms bounded with respect to the ℓ_1 -norm.) A map $a: X \rightarrow Y$ induces the homomorphism $\langle a \rangle \in L(X, Y)$, $\langle a \rangle(\langle x \rangle) = \langle a(x) \rangle$.

Straight homotopy invariants. Let X and Y be spaces. Let $C(X, Y)$ be the set of continuous maps $X \rightarrow Y$ and $[X, Y]$ be the set of their homotopy classes. For $a \in C(X, Y)$, let $[a] \in [X, Y]$ be the homotopy class of a . Let M be an abelian group, and $f: [X, Y] \rightarrow M$ be a map (a homotopy invariant). The invariant f is called *straight* if there exists a homomorphism $F: L(X, Y) \rightarrow M$ such that $f([a]) = F(\langle a \rangle)$ for all $a \in C(X, Y)$.

2010 *Mathematics Subject Classification.* 55N10.

Key words and phrases. Ordinary homology, homotopy invariant of finite degree.

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