

Accepted Manuscript

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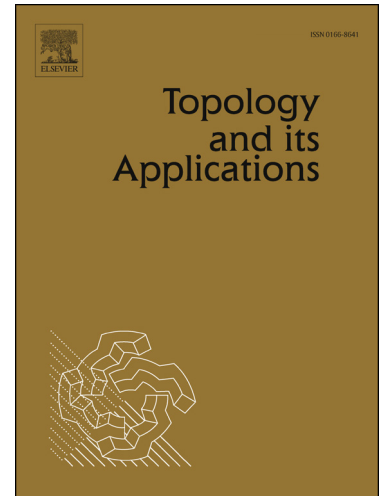
PII: S0166-8641(18)30248-7
DOI: <https://doi.org/10.1016/j.topol.2018.08.003>
Reference: TOPOL 6516

To appear in: *Topology and its Applications*

Received date: 3 April 2018
Revised date: 6 August 2018
Accepted date: 7 August 2018

Please cite this article in press as: M. Filipczak, G. Horbaczewska, Homeomorphisms of Hashimoto Topologies, *Topol. Appl.* (2018), <https://doi.org/10.1016/j.topol.2018.08.003>

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HOMEOMORPHISMS OF HASHIMOTO TOPOLOGIES

MAŁGORZATA FILIPCZAK AND GRAŻYNA HORBACZEWSKA

ABSTRACT. We investigate homeomorphisms of different types of Hashimoto topologies based on the Euclidean topology on the real line and classic σ -ideals.

1. INTRODUCTION

Let us start with a notion of Hashimoto topologies introduced independently by Martin in [12] and by Hashimoto in [4].

Let (X, \mathcal{T}) be a T_1 topological space and let \mathcal{I} be an ideal of subsets of X , containing all singletons and such that $\mathcal{I} \cap \mathcal{T} = \{\emptyset\}$. We say that such an ideal is admissible. Then the family

$$\{U \setminus P : U \in \mathcal{T}, P \in \mathcal{I}\}$$

is a base of a topology.

Under additional assumptions that (X, \mathcal{T}) is a second-countable topological space and \mathcal{I} is a σ -ideal, the considered family is a topology, denoted by $\mathcal{T}_{\mathcal{I}}$.

This kind of topologies was considered by Lukeš, Malý, Zajíček [11] as 'ideal topologies', by Jankovic and Hamlet [8] and by other authors (Lindner [10], Hejduk [5], Terepeta [14], Bingham and Ostaszewski [3]) as 'Hashimoto topologies'.

Note that such topologies have some common properties.

Theorem 1. (compare [12],[4]) *Let (X, \mathcal{T}) be a second-countable topological space and let \mathcal{I} be an admissible σ -ideal. Then*

- (1) $(X, \mathcal{T}_{\mathcal{I}})$ is T_1 .
- (2) The families of connected sets in (X, \mathcal{T}) and in $(X, \mathcal{T}_{\mathcal{I}})$ coincide.
- (3) $(X, \mathcal{T}_{\mathcal{I}})$ does not satisfy the first axiom of countability at any point.
- (4) $(X, \mathcal{T}_{\mathcal{I}})$ is not regular.

2010 *Mathematics Subject Classification.* 54A10, 54A05, 54C05.

Key words and phrases. homeomorphism, σ -ideal, Hashimoto topology.

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