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学位論文の題目	FIBREWISE GENERAL TOPOLOGY （ファイバーワイズ位相空間論）
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学位論文内容の要旨

Fibrewise General Topology is concerned most of all in extending the main notions and results concerning topological spaces to those of continuous maps. The fibrewise viewpoint is standard in the theory of fibre bundles, however, it has been recognized relatively recently that the same viewpoint is also as important in other areas such as General Topology. For an arbitrary topological space Y one considers the category **TOP**$_Y$, the objects of which are continuous maps into the space Y, and for the objects $f:X \to Y$ and $g:Z \to Y$, a morphism from f into g is a continuous map $\lambda:X \to Z$ with the property $f = g \cdot \lambda$. This situation is a generalization of the category **TOP**, since the category **TOP** is isomorphic to the particular case of **TOP**$_Y$ in which the space Y is a singleton space.

A category of maps **MAP** in which one does not restrain oneself with a fixed base space Y is introduced in Chapter 1. The objects of **MAP** are continuous maps from any topological space into any toplological space. For two objects $f_1:X_1 \to Y_1$ and $f_2:X_2 \to Y_2$, a morphism from f_1 into f_2 is a pair of continuous maps $\{\lambda_T, \lambda_B\}$, where $\lambda_T:X_1 \to X_2$ and $\lambda_B:Y_1 \to Y_2$, such that $f_2 \cdot \lambda_T = \lambda_B \cdot f_1$. Several operations in **MAP** are introduced such as products, fibrewise products, inverse limits, sums, fibrewise sums and direct limits. Finally, compact (perfect) maps as an object in the category **MAP** is considered. One can note that when $Y_1 = Y_2$ and $\lambda_B = id_Y$, then we fall under the category **TOP**$_Y$.

Chapter 2 continues with the study of the category **MAP**. Partial products are used to obtain universal type theorems for T_0, Tychonoff and zero-dimensional maps. Finally, zero-dimensional and strongly zero-dimensional maps are introduced and some well known results in the category **TOP** concerning zero-dimensional and strongly zero-dimensional spaces are generalized to the category**MAP**.

Chapter 3 introduces and investigates six covering properties on continuous maps, namely Lindelofness, finally compactness, paracompactness, subparacompactess, metacompactness and submetacompactness. Covering properties on continuous maps is a continuation of generalizing the main notions and theory concerning spaces to that of maps, and is also a generalization of compact maps (i.e. perfect maps) which are very important in General Topology. Several characterizations and properties of the above mentioned covering properties on maps are proved.

Chapter 4 defines and studies *MT*-maps, which are the fibrewise topological analogue of metrizable spaces, i.e. the extension of metrizability from the category **TOP** to the category **TOP**$_Y$ (or **MAP**). Several characterizations and properties of *MT*-maps are proved. The notion of an *MT*-space as an *MT*-map preimage of a metrizable space is introduced.

Finally, Chapter 5 gives another possible systematic way of extending definitions from the category **TOP** to the category **TOP**$_Y$ (or even to the category **MAP**).

論文審査結果の要旨

ファイバーワイズ位相空間論は，位相空間に関する主要な概念および結果を連続写像の圏に拡張することを目的としている．このファイバーワイズという観点はファイバー束の理論においては標準的であるが，位相空間論において，その重要性が認識されたのは比較的最近のことである．

本論文では，まず，位相空間論で基本的である積，和，極限のような概念および様々な演算を連続写像の圏で定義し，この圏の対象としてコンパクト写像を考察している．ついで，零次元，強零次元に関して位相空間論で得られた結果を連続写像の圏へ拡張するために，部分積の概念を用いて関連する写像の普遍型を研究している．さらには，コンパクト写像に関連して，位相空間論において重要な，6種の被覆的性質を連続写像の圏に導入し，それらの性質および特徴付けを研究している．この連続写像上の被覆的性質はコンパクト写像の一般化でもある．また，距離化可能性の概念を連続写像の圏で考察するために，ＭＴ－空間という概念を導入し，いくつかの特徴付けを与えている．最後に，位相空間の圏における定義を連続写像の圏へ拡張する組織的な方法を新しく示唆している．

以上のように，本論文はファイバーワイズ位相空間論において新しい重要な結果を与えており，その内容はこの理論の発展において有用であると判断されるので，本論文は博士（理学）の学位に値すると認める．