SOME VALUES SUBFUNCTORS OF FUNCTOR PROBABILITIES MEASURES IN THE CATEGORIES COMP

This article is dedicated to the preservation by subfunctors of the functor P of spaces of probability measures countable dimension and extensor properties of spaces of probability measures subspaces.

Key words: probability measures, dimension, the Z-set, homotopy dense, strong discrete approximation properties.

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1. Introduction

Let X be a topological space. By C(X) is denoted the ring of all continuous real valued functions on the space X with the compact-open topology. The diagonal product of all mappings at C(X) is defined by the embedding of X into $R^C(X)$.

If X is compact, then closed span of its images is a convex compact space which is denoted by $P(X)$ [6]. On the other hand the probability measure functor $P$ is covariant functor acting in the category of compact spaces and their continuous maps. $P(X)$ is a convex subspace of a linear space $M(X)$ conjugate to the space $C(X)$ of continuous functions on X with the weak topology, consisting of all non-negative functional $\mu$ (i.e.$\mu(\varphi) \geq 0$) for every non-negative $\varphi \in C(X)$ with unit norm [2,7]. For a continuous map $f: X \to Y$ the mapping $P(f): P(X) \to P(Y)$ is defined as follows $(P(f)(\mu))\varphi = \mu(\varphi \circ f)$.

The space $P(X)$ is naturally embedded in $R^C(X)$. The base of neighborhoods of a measure $\mu \in P(X)$ consists of all sets of the form $O(\mu_1, \varphi_1, \varphi_2, ..., \varphi_k, \varepsilon) = \{\mu' \in P(X) : |\mu(\varphi_i) - \mu'(\varphi_i)| < \varepsilon, i = 1, k, \}$ where $\varepsilon > 0$, $\varphi_1, \varphi_2, ..., \varphi_k \in C(X)$ are arbitrary functions.

2. About a topology on a subspace of the space of probability measures

Let $F$ be a subfunctor of $P$ with a finite support. Then the base of neighborhoods of a measure $\mu_0 = m_0^1, \delta(x_1) + ... + m_0^s, \delta(x_s) \in f(X)$ consists of sets of the form $O < \mu_0, U_1, ..., U_S > = \{\mu \in F(X) : \mu = \sum_{i=1}^{S+1} \mu_i, \}$ where $\mu_i \in M^+(X)$ is the set of all non-negative functional and $||\mu_{i+1}|| < \varepsilon$, supp$\mu_i \subset U_i, ||\mu_i - m_i^0|| < \varepsilon$ for $i = 1, ..., S$, where $U_1, ..., U_S$ are neighborhoods of points $x_1, ..., x_S$ with disjoint closures.
In fact, first we show that the set $0 < \mu_0, U_1, \ldots, U_S, \varepsilon >$ contains a neighborhood of the measures $\mu_0$ in the weak topology. For each $i = 1, \ldots, S$ we take the function $\varphi_i : X \to I$, satisfying the conditions: $\varphi_i([U_i]) = 1$, $\varphi_i(\bigcup_{j \neq i} [U_j]) = 0$. Furthermore, we take the function $\varphi_{s+1} : X \to I$ so that $\varphi_{s+1}(X \setminus U_1 \cup \ldots \cup U_S) = 1$, and $\varphi_{s+1}([x_1, \ldots, x_s]) = 0$. Now let us check the inclusion

$$O(\mu, \varphi_{s+1}(\varphi_{s+1}, \varepsilon/2) \subset O(\mu_0, U_1, \ldots, U_S, \varepsilon).$$

(2.1)

We present a measure $\mu \in O(\mu_0, \varphi_{s+1}(\varphi_{s+1}, \varepsilon/2)$ in the form $\mu = \mu_1 + \ldots + \mu_s + \mu_{s+1}$, where $\text{supp} \mu_i \subset U_i$ for $i = 1, \ldots, S$, $\text{supp} \mu_0 \subset X \setminus (U_1 \cup \ldots \cup U_S)$. Then $\frac{\varepsilon}{2} > |\mu(\varphi_{s+1}) - \mu(\varphi_{s+1})| = |\mu(\varphi_{s+1})|$. But $\mu_{s+1} \leq \mu$, so $\mu_{s+1}(\varphi_{s+1}) < \frac{\varepsilon}{2}$ at the same time, by definition of the function $\varphi_{s+1}$ we have $\mu_{s+1}(\varphi_{s+1}) = \mu_{s+1}(1_x) = 0$. So, $|\mu_i - m_i| < \frac{\varepsilon}{2}$. To prove the inclusion (1) it remains to show that $|\mu_i - m_i| < \frac{\varepsilon}{2}$. We have $\frac{\varepsilon}{2} > |\mu(\varphi_i) - \mu(\varphi_i)| > |\mu(\varphi_i) - \mu(\varphi_i)| = |\mu - (\mu_1 + \ldots + \mu_s + \mu_{s+1})(\varphi_i)| = |\varphi_i|/\text{by definition of the function}$. Then $\mu_i = m_i - (\mu_1 + \ldots + \mu_s + \mu_{s+1})(\varphi_i)$ is equal to $\mu_i - |\mu_i - m_i| < \frac{\varepsilon}{2}$. Consequently, $\mu_i = m_i - \mu_i(\varphi_i)$ is equal to $\mu_i - |\mu_i - m_i| < \frac{\varepsilon}{2}$.

On the other hand, $\int_{U_i} \varphi_i d\mu_i \leq \mu_i - m_i(\varphi_i)$ thus $\mu_i - m_i \leq \frac{\varepsilon}{2}$. The inequality $|\mu_i - m_i| < \frac{\varepsilon}{2}$ and the inclusion (1) are proved.

We now show that in every neighborhood of the base $(\mu_0, \varphi_{s+1}(\varphi_{s+1}, \varepsilon))$, there is a neighborhood of the form $O(\mu_0, U_1, \ldots, U_S, \delta >$. It is enough to consider the neighborhood of the form $O(\mu_0, \varphi_{s+1}(\varphi_{s+1}, \varepsilon)$ since the family of neighborhoods of the measure $\mu_0$ in the form $O(\mu_0, U_1, \ldots, U_S, \delta >$ is directed down by inclusion / intersection of a finite number of neighborhoods of this type contains a neighborhood of the same form. This follows from the validity of the inclusion

$$O(\mu_0, U_1 \cap U_2 \cap \ldots \cap U_S, \delta) \subset O(\mu_0, U_1 \cap U_2 \cap \ldots \cap U_S, \delta > \cap O(\mu_0, U_1 \cap U_2 \cap \ldots \cap U_S, \delta >$$

(2.2)

The main part of checking is the following:

$$\mu(U_i) - \mu(U_i) \leq m_i - m_i \leq \frac{\varepsilon}{2} \text{in}$$

$$\mu(U_i) - \mu(U_i) \leq m_i - m_i \leq \frac{\varepsilon}{2} \text{in}$$

Therefore, the measure $\mu$ from the left side of proved inclusion (3.1) we have $\mu(U_i) = \mu(U_i) - \mu(U_i) = m_i$ on the other hand.

It remains to find a neighborhood of the form $O(\mu_0, U_1, \ldots, U_S, \delta >$ in the neighborhood $O(\mu_0, \varphi_{s+1}(\varphi_{s+1}, \varepsilon))$. Since $O(\mu_0, \lambda \varphi_{s+1}(\varphi_{s+1}, \varepsilon)) = O(\mu_0, \varphi_{s+1}(\varphi_{s+1}, \varepsilon))$, for $\lambda = 0$, we can assume that $\varepsilon < 1$. Moreover, one can also assume that $\varphi > 0$. For $\delta > 0$ we take disjoint neighborhoods $U_1$ of the points $x_i$ so that oscillations of the function $\varphi$ on $U_i$ was less than $\delta$.

Then $|\mu(\varphi_i) - \mu(\varphi_i)| \leq |m_i(\varphi_i) - \int_{u_i} \varphi_i d\mu_i| + \ldots + |m_i(\varphi_i) - \int_{u_i} \varphi_i d\mu_i| + |\int_{X \setminus U_1 \cup \ldots \cup U_S} \varphi_i d\mu_i|$. Further $|m_i(\varphi_i) - \int_{u_i} \varphi_i d\mu_i| = |m_i(\varphi_i) - \int_{u_i} \varphi_i d\mu_i| + |\int_{u_i} \varphi_i d\mu_i|$. Further $|\int_{u_i} \varphi_i d\mu_i| \leq \|\varphi_i\|_{\text{sup}} \leq \|\varphi_i\|_{\text{sup}} \leq \frac{\varepsilon}{2} \leq \|\varphi_i\|_{\text{sup}}$. Therefore, for $\delta < \frac{\varepsilon}{2\|\varphi_i\|_{\text{sup}}} < \frac{\varepsilon}{2}$, the inclusion $O(\mu_0, U_1, \ldots, U_S, \delta > \subset O(\mu_0, \varphi, \varepsilon)$ holds.

### 3. Basic notions and conventions

It is known that for an infinite compact space $X$, the space $P(X)$ is homeomorphic to the Hilbert cube $Q$ [5], where $Q = \prod_{i=1}^{\infty} [-1, 1], [0, 1]$ is the segment in the real line $R$. For a natural number $n \in N$ by $P_n(X)$ we denote the set of all probability measures with support consisting of at most $n$ points, i.e. $P_n(X) = \{\mu \in P(X) : |\text{supp} \mu| \leq n\}$. The compact $P_n(X)$ is convex combinations of

Dirac measures of the form: $\mu = m_1 \delta_{x_1} + m_2 \delta_{x_2} + \ldots + m_n \delta_{x_n}, \sum_{i=1}^{n} m_i = 1, m_i > 0, x_i \in X, \delta_{x_i}$ is the Dirac measure at the point $x_i$. By $\delta(X)$ we denote the set of all Dirac measures and $P_n(X) = \bigcap_{n=1}^{\infty} P_n(X)$. Recall that the space $P_n(X) \subset P(X)$ consists of all probability measures in the form $\mu = m_1 \delta_{x_1} + m_2 \delta_{x_2} + \ldots + m_n \delta_{x_n}$ of finite supports, for each of which $m_i \geq 0$ for some $i [2, 7]$. For a natural $n$, put $P_n = \bigcap_{n=1}^{\infty} P_n$ for the compact $X$. For compact $X$, $P_n(X) = \{\mu \to P_n(X) : |\text{supp} \mu| \leq n\}$ and hold. For the compact $X$ by $P^n(X)$ we denote the set of all measures $\mu \in P(X)$, support of each of which is contained to one of the components of the compact $X [7]$. 


We say that a functor $F_1$ is a subfunctor (respectively ontofunctor) of a functor $F_2$, if there is a natural transformation $h : F_1 \to F_2$ such that for every object $X$ the mapping $h(X) : F_1(X) \to F_2(X)$ is a monomorphism (epimorphism). By $\exp$ we denote the well known hyperspace functor of closed subsets. For example, the identity functor $I_d$ is a subfunctor of the functor $\exp_{n,d}$, where $\exp_{n,d}X = \{ F \in \exp X : |F| \leq n \}$ and $n-$ of $n$-degree is a subfunctor of $\exp_{n,d}$ and $SP^{\infty}_C$. A normal subfunctor $F$ of the functor $P_n$ is uniquely determined by its value $F(\tilde{n})$ on $\tilde{n}$ that denotes $n$-point set $\{0, 1, \ldots, n-1\}$. Note that $P_n(\tilde{n})$ is the $(n-1)$-dimensional simplex $\sigma^{n-1}$. Any subset of $(n-1)$-dimensional simplex $\sigma^{n-1}$ defines a normal subfunctor of the functor $P_n$, if it is invariant with respect to simplicial mappings to itself.

**Definition [7]**. A normal subfunctor $F$ of the functor $P_n$ is locally convex if the set $F(\tilde{n})$ is locally convex.

An example which is not a normal subfunctor of the functor $P_n$ is the functor $P_n^c$ of probability measures, whose supports contains in one of components of a space. One of the examples of locally convex subfunctors of the functor $P_n$ is a functor $SP^n \equiv SP^n_{S_n}$, where $S_n$ is a group of homeomorphisms (permutation group) of $n$-point set.

**Definition [1,8]**. We say that a space $X$ is countable dimension (shortly $X \in c \cdot d$), if $X = \bigcup_{n=1}^{\infty} X_n$, where $\dim X_n < \infty$ for each $n$. In particular, $X$ is a countable union of zero-dimensional spaces, i.e. $\dim X_i = 0$ for every $X_i$.

**Theorem 1**. If $X \in c \cdot d$, then $P_{f,n}(X) \in c \cdot d$ for each $n \in N$.

**Proof**. Let $X \in c \cdot d$. Then $X$ is a countable union of finite-dimensional spaces $\dim X_i < \infty$ in the sense of dim. In this case, $P_{f,n}(X)$ is a countable union of $P_{f,n}(X_i)$, i.e. $P_{f,n}(X) = P_{f,n}(\bigcup_{i=1}^{\infty} X_i) = \bigcup_{i=1}^{\infty} P_{f,n}(X_i)$.

By [9] for each $i \in N$ the compact $P_{f,n}(X_i)$ is finite-dimensional in the sense of dim, i.e. $\dim P_{f,n}(X_i) < \infty$, more accurately, $\dim P_{f,n}(X_i) \leq n \dim X_i + \dim P_{f,n}(\tilde{n}) = n \dim X_i + n - 1$. In this case $\dim P_{f,n}(\tilde{n}) = n - 1$, since $P_{f,n}(\tilde{n})$ is a part of the $(n-1)$-dimensional simplex $\sigma^{n-1}$ spanned by the points $\{1, 2, \ldots, n-1\}$. For each $i \in N$ the space $P_{f,n}(X_i)$ is finite-dimensional. Hence, $P_{f,n}(X)$ is a countable union of finite-dimensional spaces. So $P_{f,n}(X) \in c \cdot d$. If $X$ is a countable union of zero-dimensional spaces $\dim X_i = 0$, then $\dim P_{f,n}(X_i) = n-1$ for each $i \in N$. In this case, $P_{f,n}(X)$ is also a countable union of finite-dimensional spaces, i.e. $P_{f,n}(X) \in c \cdot d$. Theorem is proved.

From the equation $P_f(X) = \bigcup_{n=1}^{\infty} P_{f,n}(X)$, in the particular case we have.

**Corollary 1**. If the compact $X$ is a $c \cdot d$ space, then $P_f(X) \in c \cdot d$.

Let $X$ be a finite-dimensional compact. Then the space $P_{f,n}(X)$ is also finite-dimensional. More accurately, $\dim P_{f,n}(X) \leq n \dim X + n - 1 = n(\dim X + 1) - 1$. On the other hand, there is an open and closed mapping decreasing dimension of spaces. Fibers of the mappings $r^X_{f,n}$ are similar cell, i.e. fibers are contractible to a point.

**Theorem 2**. Suppose $\varphi : X \to Y$ is a continuous surjective open mapping between the infinite compact $X$ and $Y$. Then the mapping $P_{f,n}(\varphi) : P_{f,n}(X) \to P_{f,n}(Y)$ is also open.

**Proof**. Let $X$ and $Y$ be infinite compacts and let the mapping $\varphi : X \to Y$ be surjective and open. Then by the normality of the functor $P_{f,n}(\varphi)$ the mapping $P_{f,n}(\varphi)$ is surjective. In this case, we have the following commutative diagram

$$
\begin{align*}
\begin{array}{c}
P_{f,n}(X) \xrightarrow{P_{f,n}(\varphi)} P_{f,n}(Y) \\
\downarrow r^X_{f,n} \quad \downarrow r^Y_{f,n} \\
\delta(X) \quad \longrightarrow [\delta(\varphi)](Y)
\end{array}
\end{align*}
$$

(3.1)

where $\delta(X)$ and $\delta(Y)$ are Dirac measures on compacts $X$ and $Y$. Let $\mu(x) = m_1 \delta x_1 + m_2 \delta x_2 + \ldots + m_k \delta x_k$. $r^Y_{f,n}(\mu_0(X)) = \delta x_1$, $P_{f,n}(\varphi)(\mu_0(x)) = m_1 \delta y_1 + m_2 \delta y_2 + \ldots + m_k \delta y_k$.

From the fact that the mapping $r^Y_{f,n}$ is open and the diagram (3) is commutative, it follows that the mapping $P_{f,n}(\varphi)$ is open. Commutativity of diagram (3) follows from Lemma 2 of Uspensky's work [3], Theorem 2 is proved.

Similarly as theorem 2, one can proof the following.

**Theorem 3**. For infinite compacts $X$ and $Y$ a surjective map is open if and only if the map $P_f(\varphi) : P_f(X) \to P_f(Y)$ is open.

**Corollary 2**. If $X \in c \cdot d$, then $P_\infty(X) \in c \cdot d$, $P_\infty(X) \in c \cdot d$ and $P_\infty(X) \in A(N) R$.

Let $X$ be a topological space and let $A \subset X$. $A$ set $\mathcal{A}$ is called homotopy dense in $X$, if there is a homotopy $h : X \times [0, 1] \to X$ such that $h(x, 0) = id_A$ and $h : (X \times \{0,1\}) \subset A$. $A$ set $\mathcal{A}$ is called homotopy void if complement of $\mathcal{A}$ is homotopy dense in $X$. The set $A \subset X$ is called the $Z-$set in $X$ [4], if $A$ is closed and for each cover $U \in cov(X)$ there is a map $f : X \to X$ such that $(f, id_A) \times U$ and $f(X) \cap A = \emptyset$.

**Theorem 4**. For any infinite compact $X$ and for each $n \in N$ the compact $P_n(X)$ is the $Z-$set in $P_\infty(X)$.

**Proof**. By infinity of metric compact $X$ the space $P_\infty(X)$ is convex and a locally convex metric space. So, $P_n(X) \in A(N) R$. On the other hand, the space is compact. It is obvious that $P_n(X)$ is a subspace...
of $P_\omega(X)$, since the compact $P_{f,n}(X)$ is a subset of the compact $P_n(X)$. We fix a measure $\mu_0 = \frac{1}{n+1} \delta_{x_1} + \frac{1}{n+1} \delta_{x_2} + \ldots + \frac{1}{n+1} \delta_{x_n}$.

Let $[0,1]$ is the unit interval. We construct a homotopy $h(\mu,t) : P_\omega(X) \times [0,1] \to P_\omega(X)$ getting $h(\mu,t) = (1-t)\mu + t\mu_0$.

Obviously, $h(\mu,0) = \mu$ i.e. $h(\mu,0) = id_{P_\omega(X)}$ and $h(\mu_0) \circ (0,1) = P_\omega(X) \cap P_\omega(X)$ and $h(\mu_0) \cap P_\omega(X)$. This means that $n \in N$ for any subspace $P_\omega(X) \cap P_\omega(X) \cap P_\omega(X) \cap P_\omega(X)$. Then the set $P_n(X)$ is homotopically small in $P_n(X)$. Hence, by one of the results in [4], the subspace $P_\omega(X) \cap P_\omega(X) \cap P_\omega(X) \cap P_\omega(X)$ are $ANR$-spaces. In this case, from theorem 1.4.4. [4] it follows that $P_\omega(X)$ is the $Z$-set in $P_\omega(X)$. Theorem 4 is proved.

Lemma 1. For any infinite compact $X$ each compact subset $A$ of $P_\omega(X)$ is a $Z$-set, i.e. $P_\omega(X)$ has the compact $Z$-property.

Proof. Let $X$ be an infinite compact, $A$ is compact subset, i.e. $A \subset P_\omega(X)$. Consider the set $A \cap P_n(X) = A_n$. It’s obvious that $P_1(X) \subset P_2(X) \subset \ldots \subset P_n(X) \subset \ldots$. By theorem 4, the set is a $Z$-set in $P_n(X)$ for each $n \in N$. Then $A = \bigcup \limits_{n=1}^{\infty} A_n$ is $\sigma - Z$-set and is closed in $P_n(X)$. Then by one of the results in [4] $A$ is a $Z$-set in $P_\omega(X)$. Lemma 1 is proved.

From Theorem 4 and Lemma 1, in particular, the cases arise.

Corollary 2. For any infinite compact $X$ the followings hold:

a) The compact $P_{f,n}(X)$ is a $Z$-set in $P_\omega(X)$ for all $n \in N$.

b) The compact $P_f(X)$ is also $Z$-set in $P_\omega(X)$.

Corollary 3. For an arbitrary infinite compact $X$ we have:

a) For each $n \in N$ the subspace $P_n(X) \cap P_{f,n}(X)$ is an $ANR$ space $\mu$ homotopically dense in $P_n(X)$.

b) The subspace $P_n(X) \cap P_{f,n}(X)$ is an $ANR$ and homotopically dense in $P_n(X)$.

We say that $X$ has strongly discrete approximation property (shortly, SDAP) if for every map $f : Q \times N \to X$ and for every cover $U \in cov(X)$ there exists a mapping $\tilde{f} : Q \times N \to X$ such that $(\tilde{f}, f) \prec U$ and the family $\{ \tilde{f}(Q \times \{ n \}) \}$ is discrete in $X$.

Let $\{ x_1, x_2, \ldots, x_{n+1} \}$ be an $(n+1)$-point subset of the compact $X$. Fix the measure $\mu_0 = \frac{1}{n+1} \delta_{x_1} + \frac{1}{n+1} \delta_{x_2} + \ldots + \frac{1}{n+1} \delta_{x_{n+1}}$. It is clear that $\mu_0 \cap P_n(X)$ and $\mu_0 \in P_\omega(X)$. We construct a homotopy $h(\mu,t) : P_\omega(X) \times [0,1] \to P_\omega(X)$ getting $h(\mu,t) = (1-t)\mu + t\mu_0$. It is known that $h(\mu,0) = id_{P_\omega(X)}$, $h(\mu,1) \cap P_n(X)$ is $\emptyset$. By the structure of the space $P_\omega(X)$ an by the definition of the homotopy this satisfies the condition of problem 10.1.4. of work [4], i.e. the set $P_n(X)$ is a strongly $Z$-set in.

Therefore, $P_\omega(X)$ is a strongly set and $P_\omega(X) \in ANR$, i.e. the following is true.

Theorem 5. For any infinite compact $X$ the space $P_\omega(X)$ has strongly discrete approximation property, i.e. $P_\omega(X) \in SDAP$.

References

[1] Addis D.F., Gresham I.H. A class of infinite - dimensional spaces: Part I: Dimension theory and Alexandroff’s problem. Fund. Math., 101 (1978), no. 3, pp.195-205. DOI: 10.4064/fm-101-3-195-205 [in English].

[2] Zhurav T.F. Some geometrical properties of the functor $P$ of probability measures: Candidate’s thesis. M.: MGU, 1989, 90 p. [in Russian].

[3] Uspensky V.V. Topological groups and Dugundji’s compacta. Mat. sb., 1989, Volume 180, Number 8, pp. 1092–1117. DOI: http://dx.doi.org/10.1070/SM1990v097n02ABEH002098 [in English].

[4] Banakh T, Radul T., Zarichnyi M. Absorbing sets in infinite — dimensional manifolds. Lviv: VNTL Publishers, 1996. URL: https://books.google.ru/books/about/Absorbing_sets_in_infinite_dimensional_m.html?id=-NkrvAAAAMAAJ&redir_esc=y [in English].

[5] Fedorchuk V.V., Filipov V.V. General topology. Basic constructions. Moscow: Moscow University Press, 1988, p. 252 [in Russian].

[6] Schepin E.V. Functors and uncountable powers of compacta. Russian Math. Surveys, 36:3 (1981), 3–62. DOI: http://dx.doi.org/10.1070/RM1981v036n03ABEH004247 [in English].

[7] Fedorchuk V.V. Probability measures in topology. Uspekhi Mat. Nauk, 1991, Volume 46, Issue 1(277), Pages 41–80. DOI: http://dx.doi.org/10.1070/RM1991v046n01ABEH002722 [in English].

[8] Borst P. Some remarks concerning C-spaces. Topology and its Applications, 2007, 154, pp. 665–674 [in English].

[9] Basmanov V.N. Covariant functors, retracts, and the dimension. Dokl. Akad. Nauk SSSR, 1983, 271, pp. 1033–1036 [in English].
СВОЙСТВА ПОДФУНКТОРОВ ФУНКТОРА ВЕРОЯТНОСТНЫХ МЕР
В КАТЕГОРИЯХ COMP

Данная заметка посвящена сохранению подфункторами функтора $P$ вероятностных мер пространств счетной размерности и экстензорным свойствам подпространств пространства вероятностных мер.

Ключевые слова: вероятностные меры, размерность, $Z$-множество, гомотопически плотно, сильное дискретное аппроксимационное свойство.

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