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PROPERTIES OF THE SPACE OF PROBABILITY MEASURES

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For a functor P and its subfunctors P_n and P_ω (see [1]) in the category of compacts and continuous mappings in itself, it is proved the following statements:

Theorem. For any infinite compact X and for any $n \in mathbbN$, and subspace $P_\omega(X)\backslash P_n(X)$, homotopy is dense in $P_\omega(X)$.

Proof. Let an X infinite compact set and $n \in N$. We construct the required homotopy $h(\mu, t)$: $P_\omega(X) \times [0,1] \to P_\omega(X)$ by setting: $h(\mu, t) = (1-t)\mu + t \cdot \mu_0$. Where μ_0 an arbitrary measure from the set $P_{n+2}(X)\backslash P_{n+1}(X)$ i.e. $\mu_0 \in P_{n+2}(X)\backslash P_{n+1}(X)$.

$$\mu_0 = m_1\delta_{x_1} + m_2\delta_{x_2} + ... + m_{n+2}\delta_{x_{n+2}}, \ \sum_{i=1}^{n+2} m_i = 1 \text{ and } m_i > 0.$$

If $t = 0$, then $h(\mu, 0) = (1-0)\mu + 0 \cdot \mu_0 = \mu$. It means, $h(\mu, 0) = id_{P_\omega(X)}$.

If $t > 0$, then $h(\mu, t) = (1-t)\mu + t \cdot \mu_0 \bar{\in} P_n(X)$, since $|\sup ph(\mu, t)| \geq n+1$.

Hence, for any $t \in (0, 1]$, the measure $h(\mu, t)$ belongs to the subspace $P_\omega(X)\backslash P_n(X)$, which is what was required to be proved. This theorem implies

Corollary 1. For any $n \in \mathbb{N}$ and infinite compact, X the subspace is $P_n(X)$ homotope negligible in $P_\omega(X)$.

In work [2], one can find the followings:

Proposition [2]. Suppose X is ANR space and $Y \subset X$ homotopy is dense in X. Then Y also ANR space.

Based on this proposition [2] and proved theorem, one can derive the following corollary:

Corollary 2. For any infinite compact X and any $n \in \mathbb{N}$, subspace $P(X)\backslash P_n(X)$ is ANR space.

Consequently, due to the convexity of these subspaces, they are contractible spaces AR such for any $n \in \mathbb{N}$ and any infinite compact X, spaces $P(X)\backslash P_n(X)$ and $P_\omega(X)\backslash P_n(X)$ are AR spaces. On the other hand, there is $P_\omega(X)\backslash P_n(X) \subseteq P(X)\backslash P_n(X)$.

References

1. Fedorchuk V.V. Probabilistic measures in topology// Mat. Nauk, 1991, Vol.46, no 1, pp.41-80.

2. T.Bankh, T.Radul, M.Zarichnyi Absorbing sets in infinite –dimensional Manifolds. Math. Studies. Monog. Ser.1, Lviv: VNTI Publ., 1996.