The properties of tightness type of space of the permutation degree

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Let k be an infinite cardinal. We say that a subset F of X is k-closed (in X) if for every $B \subset F$ with $|B| \leq k$, the closure in X of the set B is contained in F [1].

Let k be an infinite cardinal, X and Y topological spaces. A map $\varphi\colon X \to Y$ is said to be k-continuous if for every subspace A of X such that $|A| \leq k$, the restriction $\varphi|A$ is continuous [1].

The tightness $t(x, X)$ of x in X is defined by $t(x, X) = \min\{k :$ for any set $A \subset X$ with $x \in \overline{A}$, there exists a subset B of A such that $|B| \leq k$ and $x \in \overline{B}\}$, and define the tightness $t(X)$ of X by $t(X) = \sup\{t(x, X) : x \in X\}$ [1].

The functional tightness of a space X is $t_0(X) = \min\{k : k$ is an infinite cardinal and every k-continuous real-valued function on X is continuous$\}$ [1].

The space of the permutation degree is given in [2].

Theorem. *If a set F is k-closed in a compact space X, then the set $SP^n_G F$ is k-closed in $SP^n_G X$.*

Theorem. *Let X be a compact space, $\bar{x} = (x_1, x_2, \ldots, x_n) \in X^n$ and $[\bar{x}] = \pi^s_{n,G}(\bar{x})$. If $t(SP^n_G X) \leq k$ and $t_0(\bar{x}, (\pi^s_{n,G})^{-1}[\bar{x}]) \leq k$, then $t_0(\bar{x}, X^n) \leq k$ and $t_0(x_i, X) \leq k$ for every $i = 1, \ldots, n$.*

[1] A. V. Arkhangelskii, *Topological Function Spaces*, Mathematics and Its Applications, Vol. 78 (1992), pp. 205.

[2] V. V. Fedorchuk and V. V. Filippov, *Topology of hyperspaces and its applications*, Mathematica, cybernetica. Moscow, 1989, pp. 48.