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On topological groups admitting a functorial embedding of the unit interval

Abstract. Let X be a topological space and $i : X \to G$ be an embedding of X into a topological group. We call i a *functorial embedding*, if for every homeomorphism f of X there exists a continuous homomorphism $\varphi_f : G \to G$ such that the following diagram is commutative:

$$\begin{array}{ccc} X & \stackrel{i}{\to} & G \\ f \downarrow & & \downarrow \varphi_f \\ X & \stackrel{i}{\to} & G \end{array}$$

Answering the question of Banakh and Zarichnyj [1], it was established in [2] that a topological group G contains a copy of (a continuous analog of) the Frechet-Urysohn fan provided it admits a functorial embedding of the interval $[0, 1]$.

In this talk we shall discuss possible improvements of this result. Namely, we shall establish some conditions which imply that a topological group G admitting a functorial embedding of $[0, 1]$ contains a topological copy of the Markov free topological group over $[0, 1]$.

References

[1] T. Banakh, M. Zarichnyi, *The interval* $[0, 1]$ *admits no functorial embedding into a finite-dimensional or metrizable topological group*, Serdica Mathematical Journal 26 (2000), 14.

[2] T. Banakh, D. Repovš, L. Zdomskyy, *Fréchet-Urysohn fans in free topological groups*, Journal of Pure and Applied Algebra 212 (2008), 21052114.