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Predecessors and successors of the Euclidean topology on a subgroup of $GL(2, \mathbb{R})$. (English)

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Summary: In this paper, we investigate the existence of predecessors and successors of the usual Euclidean topology $\tau_X$ on $X$ in $\mathcal{P}G(X)$ and $G(X)$, where $X = \{ \begin{pmatrix} a & b \\ 0 & 1 \end{pmatrix} : a > 0, a, b \in \mathbb{R} \}$ and $G(X)(\mathcal{P}G(X))$ is the lattice of all topological (paratopological) group topologies on $X$. We give a complete description of predecessors of $\tau_X$ in $G(X)$ based on the fact that $(X, \tau_X)$ is a minimal Hausdorff topological group which was shown by Dierolf and Schwanengel in 1979. Then we give a negative answer to an open problem posed in [8]. Some constructions of successors of $\tau_X$ in $\mathcal{P}G(X)$ are also given. We also prove that $\tau_X$ has no successors in $G(X)$.

MSC:
22A05 Structure of general topological groups
54A25 Cardinality properties (cardinal functions and inequalities, discrete subsets)
54H11 Topological groups (topological aspects)
54A35 Consistency and independence results in general topology

Keywords:
gap; predecessor; successor; minimal Hausdorff topological group

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References:


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