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Cardinal invariants of coset spaces. (English) [Zbl 07375606]
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Summary: A topological space $X$ is called a coset space if $X$ is homeomorphic to a quotient space $G/H$ of left cosets, for some closed subgroup $H$ of a topological group $G$. In this paper, we investigate the cardinal invariants of coset spaces. We first show that if $H$ is a closed neutral subgroup of a topological group $G$, then $\triangle(G/H) = \psi(G/H)$, $w(G/H) = d(G/H) \cdot \chi(G/H)$ and $w(G/H) = \omega(G/H) \cdot \chi(G/H)$.

We also prove that if $H$ is a closed subgroup of a feathered topological group $G$, then (1) $w(G/H) = d(G/H) \cdot \chi(G/H)$ and $w(G/H) = \omega(G/H) \cdot \chi(G/H)$; (2) the quotient space $G/H$ is metrizable if and only if $G/H$ is first-countable.

At the end, we consider some applications of $sp$-networks in coset spaces. In particular, we show that if $H$ is a closed neutral subgroup of a topological group $G$, then (1) $sp_nw(G/H) = d(G/H) \cdot sp\chi(G/H)$; (2) the quotient space $G/H$ is metrizable if and only if $G/H$ has countable $sp$-character.

MSC:
22A05 Structure of general topological groups
54A25 Cardinality properties (cardinal functions and inequalities, discrete subsets)
54E35 Metric spaces, metrizability
54G20 Counterexamples in general topology
54H11 Topological groups (topological aspects)

Keywords: topological group; coset space; neutral subgroup; feathered group; cardinal function; metrizability

Full Text: DOI

References:


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