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Some results in quasitopological homotopy groups. (English) Zbl 1471.55018

Let \((X, x)\) be a pointed space and \(\Omega^n(X, x)\) be the \(n\)-th loop space of \((X, x)\) with the compact-open topology. The \(n\)-th quasitopological homotopy group \(\pi^\text{qtop}_n(X, x)\) of \((X, x)\) is the homotopy group \(\pi_n(X, x)\) endowed with the natural quotient topology inherited from the space \(\Omega^n(X, x)\). It is known that \(\pi^\text{qtop}_n(X, x)\) is a quasitopological group. In this paper, the authors prove that: for all \(n \geq 1\) and \(1 \leq k \leq n - 1\),

\[
\pi^\text{qtop}_n(X, x) \cong \pi^\text{qtop}_{n-k}(\Omega^k(X, x), e_x),
\]

where \(e_x\) is a constant \(k\)-loop in \(X\) at \(x\). By using this fact, some results about quasitopological homotopy groups are obtained. With the help of the long exact sequence of a based pair and a fibration in \(\text{qTop}\) introduced by J. Brazas [Topology Appl. 160, No. 1, 170–188 (2013; Zbl 1264.57001)], the authors also obtain some further results in this field.

Reviewer: Shou Lin (Ningde)

MSC:

55Q99 Homotopy groups
54H11 Topological groups (topological aspects)
22A05 Structure of general topological groups

Keywords:
quasitopological group; homotopy group; topological group; pointed space; compact-open topology

Full Text: DOI

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