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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 \(\pi^{qtop}_n(X, x)\) 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 \(\pi^{qtop}_n(X, x)\) is a quasitopological group. In this paper, the authors prove that: for all \(n \geq 1\) and \(1 \leq k \leq n - 1\),
\[
\pi^{qtop}_n(X, x) \cong \pi^{qtop}_{n-k}(\Omega^k(X, x), e_x),
\]
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 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.

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