Some analogues of topological groups. (English) [Zbl 07341091]

Summary: Let \((G, *)\) be a group and \(\tau\) be a topology on \(G\). Let \(\tau^\alpha = \{A \subseteq G : A \subseteq \text{Int}(\text{Cl}(\text{Int}(A)))\}\), \(g*\tau = \{g*A : A \in \tau\}\) for \(g \in G\). In this paper, we establish two relations between \(G\) and \(\tau\) under which it follows that \(g*\tau \subseteq \tau^\alpha\) and \(g*\tau^\alpha \subseteq \tau^\alpha\), designate them by \(\alpha\)-topological groups and \(\alpha\)-irresolute topological groups, respectively. We indicate that under what conditions an \(\alpha\)-topological group is topological group. This paper also covers some general properties and characterizations of \(\alpha\)-topological groups and \(\alpha\)-irresolute topological groups. In particular, we prove that (1) the product of two \(\alpha\)-topological groups is \(\alpha\)-topological group, (2) if \(H\) is a subgroup of an \(\alpha\)-irresolute topological group, then \(\alpha\text{Int}(H)\) is also subgroup, and (3) if \(A\) is an \(\alpha\)-open subset of an \(\alpha\)-irresolute topological group, then \(\langle A\rangle\) is also \(\alpha\)-open. In the mid of discourse, we also mention about their relationships with some existing spaces.

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