Mathematics > Group Theory

Characterizing sequences for precompact group topologies

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A precompact group topology τ on an abelian group G is called {\em single sequence characterized} (for short, {\em ss-characterized}) if there is a sequence $\mathbf{u}= (u_n)$ in G such that τ is the finest precompact group topology on G making $\mathbf{u}=(u_n)$ converge to zero. It is proved that a metrizable precompact abelian group (G,τ) is ss-characterized iff it is countable. For every metrizable precompact group topology τ on a countably infinite abelian group G there exists a group topology η such that η is strictly finer than τ and the groups (G,τ) and (G,η) have the equal Pontryagin dual groups. We give a complete description of all ss-characterized precompact abelian groups modulo countable ss-characterized groups from which we derive:
(1) No infinite pseudocompact abelian group is ss-characterized.
(2) An ss-characterized precompact abelian group is hereditarily disconnected.

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