On group-valued continuous functions: k-groups and reflexivity

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This talk concerns two results about $\mathcal{C}(X, A)$, the set of continuous maps on a space X with values in a topological group A, equipped with pointwise operations and the compact-open topology.

Definition. A topological group G is a *k-group* if every group homomorphism $\varphi : G \to H$ into a topological group H such that $\varphi_{|K}$ is continuous for every compact subset K of G is actually continuous.

Definition. For an Abelian topological group G, let $\hat{G}$ denote the group of all continuous characters of G, and equip $\hat{G}$ with the compact-open topology. The group G is *reflexive* if the evaluation map $\alpha_G : G \to \hat{\hat{G}}$ is a topological isomorphism.

Theorem *If X is a compact Hausdorff space such that $\mathcal{C}(X, \mathbb{R}/\mathbb{Z})$ is divisible and A is a locally compact Abelian group, then:*

1. *$\mathcal{C}(X, A)$ is a k-group; and*

2. *$\mathcal{C}(X, A)$ is reflexive.*

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