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RELATIONS BETWEEN NON-COMPACT TRANSFORMATION GROUPS AND COMPACT TRANSFORMATION GROUPS

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§ 1. Introduction.

In this paper certain relations between non-compact transformation groups and compact transformation groups are studied. The notion of reducibility and separability of transformation groups is introduced, several necessary and sufficient conditions are established: (1) A separable transformation group to be locally weakly almost periodic, (2) A reducible and separable transformation group to be a minimal set and (3) A reducible and separable transformation group to be a fibre bundle. As applications we show, among other things, that (1) for certain reducible transformation groups its fundamental group is not trivial which is a generalization of a result in [4]. (2) Given a transformation group (Y, N, Π), where Y is compact Hausdorff and N is discrete and a group covering $\tilde{p} : T \to H$, where H is a compact group, T is a connected group, and the kernel of $\tilde{p}$ is N, then there is a transformation group (X, T, σ), where X is again compact Hausdorff, which is an extension of (Y, N, Π). Furthermore, if (T, N, Π) is minimal, so is (X, N, σ), if (Y, N, Π) is universal minimal so is (X, N, σ). Conversely if (X, T, σ) is a universal minimal set, where X is compact Hausdorff and if $f : T \to H$ is a group covering where H is a compact group, then for every $x \in X$ $cl(\sigma(x, N))$ must be a universal minimal under N, and (3) by using the conception of Whitney sum of two minimal sets, we find that the Cartesian product of two minimal, but not totally minimal, continuous flows, will never be minimal, if they have a same integer subgroup satisfying the property (A).

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