ISOMETRIC MODELS FOR GROUPS WITH A BI-INVARIANT METRIC

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ABSTRACT. We prove that any compact group with a bi-invariant metric is isometrically isomorphic to the isometry group of some compact metric space and, more generally, that any group with a bi-invariant metric is isometrically isomorphic to the isometry group (equipped with the supremum metric) of some metric space. We start with separable groups with a bounded metric (this is the easiest case) and then proceed to describe the necessary changes for the separable groups with an unbounded metric. Following that we describe the non-separable case, again starting with a bounded case and following that with modifications for the unbounded case. There are of course examples of separable spaces with non-separable isometry groups, therefore we also show that if a group can be modeled as an isometry group of a separable space, then any of its closed subgroups can be modeled as an isometry group of a separable space as well.

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