Coverings of topological semi-abelian algebras

Osman MUCUK, Serap DEMİR

Department of Mathematics, Erciyes University, Kayseri, Turkey
E-mail: mucuk@erciyes.edu.tr

Abstract: In this work, we study on topological semi-abelian algebras which are topological models of given an algebraic theory T whose category of models is semi-abelian; and investigate some results on the coverings of topological models of such theories yielding semi-abelian categories.

Semi-abelian categories introduced in [4] are those which are the Barr exact categories with a zero object and binary coproducts, in which the short five lemma holds. All abelian categories are semi-abelian, but there are many more examples: the category of all groups, of rings without unit, of Ω-groups, of Heyting semi-lattices, of locally boolean distributive lattices, of loops, of presheaves or sheaves of these, and so on.

In this paper given an algebraic theory T whose category of models is semi-abelian, we study the category $\mathsf{Top}^{\mathsf{T}}$ of topological models of T and investigate some properties of covering morphisms of topological models of such theories. For example, when T is the theory of groups, we recapture the results on the covering morphism of topological groups.

Keywords: semi-abelian category, topological T-algebra, covering maps, internal groupoid

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