

EXISTENCE OF SLICE FOR PROPER SEMI-ALGEBRAIC ACTION AND ITS APPLICATIONS

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In this talk we extend some of the well-known theorems in topological or smooth transformation group theory to the semi-algebraic category.

A semi-algebraic set is a subset of \mathbb{R}^N defined by finitely many polynomials equations and inequalities. A semi-algebraic map between semi-algebraic sets is a map whose graph is semi-algebraic. A semi-algebraic group G and a semi-algebraic G -set are defined obviously. A proper action of a noncompact group is defined by Palais, and it is a certain generalization of a compact group action.

We first show the existence of semi-algebraic slices for a semi-algebraic set M with a proper action of a semi-algebraic group G (not necessarily compact). Moreover we show that M (not necessarily compact) can be covered by finitely many semi-algebraic G -tubes.

We then discuss some applications. First of all we can show that M can be semi-algebraically and equivariantly embedded in a G -representation space. We can also find a G -CW complex structure on M . Furthermore, if G is compact, we can show the semi-algebraic version of the covering homotopy theorem, which roughly says that a semi-algebraic homotopy in the orbit space M/G can be lifted to a semi-algebraic G -homotopy in M . We can also prove the validity of the semi-algebraic version of a Bredon's conjecture, which roughly says that if the orbit space M/G is a mapping cylinder then so is the G -space M .

Even though the statements of results we obtained are similar to their topological analogues, the proof of them are quite different.