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Actions of profinite groups and equivariant singular homology

A profinite group is a group which is the inverse limit of finite groups. Each profinite group is compact and totally disconnected. On the other hand it is a well known fact that every totally disconnected, compact topological group is a profinite group.

To begin with we consider the case when the transformation group G is a totally disconnected, locally compact group. In this case any short exact sequence of covariant coefficient systems for G , over some ring R , gives rise to a corresponding long exact sequence of equivariant singular homology groups. We discuss some specific choices of coefficient systems.

As an illustration of this method, to use short exact sequences of appropriate covariant coefficient systems for G , we show that in the case when G is a finite cyclic group of prime order p , we are able to develop P. A. Smith theory and prove P. A. Smith type theorems for singular homology and arbitrary topological spaces.

We then consider the case of profinite groups, and in particular the case when the transformation group G is the group of p -adic integers, for some prime p .

As some sort of motivation for this work is of course the Hilbert-Smith conjecture.