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Bredon Cohomology with Local Coefficients

Bredon [1] defined his version of equivariant cohomology with constant coefficients for spaces with an action of a discrete group G. This was generalized to arbitrary topological groups by Illman [2]. This definition was then extended to local coefficient systems independently by Moerdijk and Svensson [3] and by the Mukherjees [4]. Moerdijk and Svensson's approach was only applicable to discrete groups and used the cohomology of a category constructed to represent the G-space. The Mukherjees' approach was closer to the work by Illman. Mukherjee and Pandey [5] showed that the two definitions agree when the group G is discrete.

Laura Scull and I have generalized the construction of the category given by Moerdijk and Svensson to G-spaces for an arbitrary toplogical group G. We will show that the resulting definition of Bredon cohomology agrees with the one given by the Mukherjees. As an application we get the Serre spectral sequence in the more general setting of a topological group G.

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[4] A. Mukherjee, G. Mukherjee, Bredon-Illman cohomology with local coefficients, *Quart. J. Math. Oxford* 47 (1996), pp. 199-219.

[5] Goutam Mukherjee, Neeta Pandey, Equivariant cohomology with local coefficients, *Proceedings of the AMS* 130 (2002), pp. 227-232.