

The loop space of a p-local group

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The homotopy type of the loop space on the p-complete classifying space of a finite group was studied by myself and a few other researchers since the early 90s. The homology of such loop spaces is of particular interest from the homotopy theoretic point of view, as it exhibits a rather rigid behaviour, yet not very well understood. From the algebraic point of view, works of Benson-Greenlees-Iyengar suggest the loop space homology of p-completed classifying spaces provides interesting examples of much more general phenomena. In his 2009 paper “An algebraic model for chains on ΩBG_p^\wedge ”, Benson showed that the homology can be defined purely algebraically through what he named a “squeezed resolution” for the group in question.

The theory of p-local finite and compact groups allows one to study homotopy theoretic and algebraic properties of p-completed classifying spaces in a very general context, and where a genuine group is not necessarily available. Thus the question that arises naturally is whether one can construct an analog of a squeezed resolution for p-local groups. The answer to this question turns out to be positive in a more general sense. In an ongoing project with Broto and Oliver we show that for any small category \mathcal{C} satisfying certain conditions, the homology of the loop space of its p-completed nerve can be understood algebraically by means of a squeezed resolution. In this talk I will present the construction of squeezed resolutions in this context and discuss some of their properties. I will also relate this to a number of interesting homotopy theoretic questions.

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