

About localization and cellularization

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The objective of this mini-course is to describe ideas in homotopy theory which can be – and have been – applied in algebraic settings, compare some differences and similarities, and present a few recent results. The theory of homotopical localization goes back to the seventies, and has been developed in particular by Bousfield and Dror Farjoun. The book [1] of the latter deals with topological spaces and is a very nice read (but not a prerequisite for the course!). The first day will be devoted to the construction of homotopical localization and cellularization functors, a sort of dual notion. This will be done for spaces even though [2] shows how to do this in a fairly general model categorical context. When translated to groups, and potentially other semi-abelian categories, interesting features can be studied.

Discussions with Marino Gran motivate the second part of the course. We noticed that there are striking similarities between questions addressed in joint work with Dror Farjoun about what we called conditional flatness, and semi left-exactness, a notion he characterized in a recent preprint with Lack. This central part of the course will hopefully constitute a meeting point between the homotopy and the category communities.

In the third lecture I would like to talk about Chachólski and Farjoun's way of translating and extending classical results into cellular statements. My aim is to present new results about the Blakers-Massey Theorem and Postnikov sections.

REFERENCES

- [1] Farjoun, Emmanuel Dror, *Cellular spaces, null spaces and homotopy localization*, Lecture Notes in Mathematics **1622**, Springer Verlag, Berlin, 1996. xiv+199 pp.
- [2] Hirschhorn, Philip S., *Model categories and their localizations*, Mathematical Surveys and Monographs **99**, American Mathematical Society, Providence, RI, 2003. xvi+457 pp.