

# $t$ -structures on $\infty$ -categories with an application to mixed graded complexes

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## Abstract

Beilinson, Bernstein and Deligne introduced the notion of a  $t$ -structure on a triangulated category in [BBD82], with the intended goal to axiomatise the main properties of admissible abelian subcategories of a triangulated category. Since then,  $t$ -structures have provided a key tool for studying the homological properties of derived and triangulated categories, and have been successfully extended to the setting of higher (i.e., homotopical) algebra, see for example [Lur17].

In this talk, after recalling some basic definitions and motivations of the classical definition, I shall explain how these concepts are generalized in the  $\infty$ -categorical setting, providing some well known examples both in the classical and in the homotopical setting. Finally, I shall briefly introduce the concepts of *filtered complexes* and *mixed graded complexes* (in the sense of [PTVV13]), hinting at some of their many applications. After explicitly describing a  $t$ -structure on filtered complexes originally due to Beilinson ([Bei87]), I shall exhibit a  $t$ -structure on mixed graded complexes, describing how it interacts with the Beilinson  $t$ -structure on filtered complexes.

## REFERENCES

- [Bei87] A. A. Beilinson. “On the derived category of perverse sheaves”. In: *K-theory, arithmetic and geometry (Moscow, 1984–1986)*. Vol. 1289. Lecture Notes in Math. Springer, Berlin, 1987, pp. 27–41. DOI: [10.1007/BFb0078365](https://doi.org/10.1007/BFb0078365). URL: <https://doi-org.pros.lib.unimi.it:2050/10.1007/BFb0078365>.
- [BBD82] A. A. Beilinson, J. Bernstein, and P. Deligne. “Faisceaux pervers”. In: *Analysis and topology on singular spaces, I (Luminy, 1981)*. Vol. 100. Astérisque. Soc. Math. France, Paris, 1982, pp. 5–171.
- [Lur17] Jacob Lurie. *Higher Algebra*. 2017. URL: <http://www.math.harvard.edu/~lurie/papers/HA.pdf>.
- [PTVV13] Tony Pantev, Bertrand Toën, Michel Vaquié, and Gabriele Vezzosi. “Shifted symplectic structures”. In: *Publ. Math. Inst. Hautes Études Sci.* 117 (2013), pp. 271–328. ISSN: 0073-8301. DOI: [10.1007/s10240-013-0054-1](https://doi.org/10.1007/s10240-013-0054-1). URL: <https://doi.org/10.1007/s10240-013-0054-1>.