Hearts of t-structures which are Grothendieck categories

Carlos Parra¹, Manuel Saorín²

T-structures on triangulated categories were introduced in the early eighties by Beilinson, Bernstein and Deligne in their study of the perverse sheaves on an algebraic or an analytic variety (see [2]). The main discovery of this concept was the existence of an abelian category, called the heart of the t-structure, which allowed the development of a homology theory what is intrinsic to the triangulated category.

In [1], Alonso, Jeremías and Saorín classify all the compactly generated t-structures on the derived category of a commutative noetherian ring $R$. They described such t-structures in terms of decreasing filtrations by supports of $\text{Spec}(R)$. We study when the heart of such a t-structure is equivalent to a Grothendieck category or to a module category, for some decreasing filtrations. In fact, we show that if the filtration is eventually constant, then the heart is a Grothendieck category. In case $R$ is a connected ring and the filtration is bounded, then the heart is equivalent to a category of module if and only if the t-structure is a translation of the canonical t-structure.

References


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1Departamento de Matemáticas  
Universidad de los Andes  
Mérida, Venezuela  
carlosparra@ula.ve

2Departamento de Matemáticas  
Universidad de Murcia  
Aptdo. 4021, 30100 Espinardo, Murcia, Spain  
msaorinc@um.es