

# t-structures and torsion pairs induced by $n$ -tilting modules

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**Abstract:** We consider the  $t$ -structure induced by an infinitely generated  $n$ -tilting  $R$ -module and we investigate when its heart is a Grothendieck category.

For a good  $n$ -tilting module  $T$  we give characterizations in terms of properties of the category of modules over the endomorphism ring of  $T$ .

Parra and Saorín proved that, if  $T$  is a 1-tilting module, then the heart of the  $t$ -structure is a Grothendieck category if and only if the torsion free class associated to  $T$  is closed under direct limits.

If  $n > 1$  we look for conditions on the category of  $R$ -modules and on the tilting module itself proving some necessary conditions. In particular we show that, again, the torsion free class defined by  $T$  must be closed under direct limits.