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On hearts which are module categories. (English) Zbl 1397.16026
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Summary: Given a torsion pair $\mathbf{t} = (\mathcal{T}, \mathcal{F})$ in a module category $R\text{-Mod}$ we give necessary and sufficient conditions for the associated Happel-Reiten-Smalø \mathbf{t} -structure in $\mathcal{D}(R)$ to have a heart $\mathcal{H}_{\mathbf{t}}$ which is a module category. We also study when such a pair is given by a 2-term complex of projective modules in the way described by *M. Hoshino* et al. [*J. Pure Appl. Algebra* 167, No. 1, 15–35 (2002; [Zbl 1006.18011](#))] (HKM). Among other consequences, we completely identify the hereditary torsion pairs \mathbf{t} for which $\mathcal{H}_{\mathbf{t}}$ is a module category in the following cases: i) when \mathbf{t} is the left constituent of a TTF triple, showing that \mathbf{t} need not be HKM; ii) when \mathbf{t} is faithful; iii) when \mathbf{t} is arbitrary and the ring R is either commutative, semi-hereditary, local, perfect or Artinian. We also give a systematic way of constructing non-tilting torsion pairs for which the heart is a module category generated by a stalk complex at zero.

MSC:

- 16S90 Torsion theories; radicals on module categories (associative algebraic aspects) Cited in 2 Documents
- 16E35 Derived categories and associative algebras
- 18E30 Derived categories, triangulated categories (MSC2010)

Keywords:

derived category; Happel-Reiten-Smalø \mathbf{t} -structure; heart of a \mathbf{t} -structure; module category; torsion pair; TTF triple; tilting module

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