Zheng, Qilian; **Wei, Jiaqun**

$(n+2)$**-angulated quotient categories.** (English) Zbl 07138021

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As is well known, there are similarities between exact categories and triangulated categories, which enticed *H. Nakaoka* and *Y. Palu* ["Mutation via Hovey twin cotorsion pairs and model structures in extriangulated categories", arXiv:1605.05607] to introduce the notion of extriangulated categories. On the other hand, Geiss, Keller and Opperman [*C. Geiss* et al., J. Reine Angew. Math. 675, 101–120 (2013; Zbl 1271.18013)] introduced the notion of $(n+2)$-angulated categories as a higher-dimensional analogue of triangulated categories. *G. Jasso* [Math. Z. 283, No. 3–4, 703–759 (2016; Zbl 1356.18005)] developed the theory of n-abelian categories and n-exact categories, showing that n-cluster-tilting subcategories of abelian (exact)categories are n-abelian (n-exact)and besides that the quotient category of a Frobenius n-exact category is of a natural $(n+2)$-angulated structure (a higher-dimensional analogue of Theorem 2.6 in [*D. Happel*, Triangulated categories in the representation theory of finite dimensional algebras. Cambridge (UK) etc.: Cambridge University Press (1988; Zbl 0635.16017)]). *M. Herschend*, *Y. Lin* and *H. Nakaoka* ["n-exangulated categories", arXiv:1709.06689] introduced an n-analogue of extriangulated categories called n-exangulated categories.

P. Zhou and *B. Zhu* [J. Algebra 502, 196–232 (2018; Zbl 1388.18014)] demonstrated that, for rigid subcategories $\mathcal{D} \subseteq \mathcal{Z}$ in an extriangulated category, if $(\mathcal{Z}, \mathcal{Z})$ is a $\mathcal{D}$-mutation pair and $\mathcal{Z}$ is extension-closed, then the quotient category $\mathcal{Z}/\mathcal{D}$ is a triangulated category, generalizing the results in [Zbl 0635.16017; *O. Iyama* and *Y. Yoshino*, Invent. Math. 172, No. 1, 117–168 (2008; Zbl 1140.18007); Zbl 1388.18014; *P. Jørgensen*, Proc. R. Soc. Edinb., Sect. A, Math. 140, No. 1, 65–81 (2010; Zbl 1201.16020)].

This paper is concerned with $(n+2)$-angulated categories. It is shown (Theorem 3.11), after defining mutation pairs of subcategories in an n-exangulated category, that if $(\mathcal{Z}, \mathcal{Z})$ forms a $\mathcal{D}$-mutation pair, then the quotient category $\mathcal{Z}/\mathcal{D}$ is an $(n+2)$-angulated category.

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MSC:

18E10 Exact categories, abelian categories
18E30 Derived categories, triangulated categories
18G05 Projectives and injectives (homological algebra)

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