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Title: Applications of exact structures in abelian categories

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In an abelian category $\mathcal{A}$ with small Ext groups, we show that there exists a one-to-one correspondence between any two of the following: balanced pairs, subfunctors $\mathcal{F}$ of $\mathrm{Ext}^1_{\mathcal{A}}(-,-)$ such that $\mathcal{A}$ has enough $\mathcal{F}$-projectives and enough $\mathcal{F}$-injectives and Quillen exact structures $\mathcal{E}$ with enough $\mathcal{E}$-projectives and enough $\mathcal{E}$-injectives. In this case, we get a strengthened version of the translation of the Wakamatsu lemma to the exact context, and also prove that subcategories which are $\mathcal{E}$-resolving and epimorphic precovering with kernels in their right $\mathcal{E}$-orthogonal class and subcategories which are $\mathcal{E}$-coresolving and monomorphic preenveloping with cokernels in their left $\mathcal{E}$-orthogonal class are determined by each other. Then we apply these results to construct some (pre)enveloping and (pre)covering classes and complete hereditary $\mathcal{E}$-cotorsion pairs in the module category.

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