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主　論　文　の　要　旨

論 文 題 目　COTORSION PAIRS ON TRIANGULATED AND EXACT

CATEGORIES（三角圏と完全圏上の余ねじれ対）

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論　文　内　容　の　要　旨

Cluster tilting subcategory and **t-structures** play important roles in representation theory.

The concept of cluster tilting is fundamental to categorify Fomin-Zelevinsky cluster algebras. The quotient of a triangulated category by a cluster tilting subcategory is abelian by Koenig and Zhu.
Beilinson, Bernstein and Deligne introduced the notion of a t-structure in a triangulated category. One of the main results of their article states that the heart of a t-structure is an abelian category.

These two notions can be unified to a structure called **cotorsion pair**. Nakaoka introduced the notion of **hearts** of cotorsion pairs on triangulated categories, as a generalization of the heart of t-structure, and showed that the hearts are abelian categories, which generalizes the results for t-structures and cluster tilting subcategories. Moreover, he generalized these results to a more general setting called twin cotorsion pair.

Motivated by Nakaoka's results of cotorsion pairs on triangulated category, in my paper, we consider cotorsion pairs on Quillen's exact category, which is a generalization of abelian categories and there are many important examples of it. The cotorsion pairs on abelian categories goes back to Salce, and it has been deeply studied in the representation theory during these years, especially in tilting theory and Cohen-Macaulay modules.

According to Happel, the stable category of a Frobenius category (which is a special case of exact category) has a structure of a triangulated category. Most triangulated categories appearing in representation theory turn out to be in fact algebraic (i.e. stable categories of Frobenius categories). Moreover, if we have a cotorsion pair on a Frobenius category, then it is still a cotorsion pair on the stable category of this Frobenius category.

We introduce the heart of a cotorsion pair (U,V) on the exact category B with enough projectives enough injective. We first prove that the heart is abelian. We will apply this result to the case of cluster tilting subcategory. A more general setting, which is called twin cotorsion pair, is also discussed. We show that the hearts of twin cotorsion pairs are semi-abelian, and they have nicer structure under certain assmption. Then we construct a **half exact** functor from B to the heart, and as an application, we give a sufficient condition when two hearts are equivalent to each other. At last, by using this functor, we show that the heart is equivalent to functor category over the **coheart** of (U,V).