Infinite power of ideals in abelian categories

Sinem Odabaşı[1]

The 'Phantom phenomenon' has been sucessufelly carried into abelian setting firstly in [Her07], later in [FGHT13]. In this talk, we claim to introduce 'ghost phenomenon' in abelian setting which is also compatible with the existent ones in certain tringulated categories as mentioned above. Besides, we observe that the problem of being zero a finite power of ghost ideal in these triangulated categories is strongly related to being a certain type of object ideals and cotorsion pairs. Using certain techniques and results on cotorsion pairs, now we are able to ensure that under mild conditions the ideal 'Ghost' is turned out to be 'zero' in some infinite power.

We then apply this formalism to the ideal Ghost of chain morphisms which induce zero in homology in the category of chain complexes of left R-modules. In general, Ghost is not an object ideal, however, so is $\text{Ghost}^{\aleph_0}$. Namely, $\text{Ghost}^{\aleph_0} =< \text{Acic} >$, where Acic is the class of acyclic chain complexes.

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References

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[1]Universidad Austral de Chile
sinem.odabasi@uach.cl