Gorenstein projective coresolutions

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Abstract.

Gorenstein homological algebra and the notion of Gorenstein projective modules go back to [4]. These notions and the related topics such as Gorenstein injective ([5]) and Gorenstein flat ([6]) have been extensively studied throughout the last years. It is known that over a Gorenstein ring R, the class of Gorenstein injective modules is preenveloping and the class of Gorenstein projective modules is precovering on R-Mod, see [5]. And Tate Ext groups $\widehat{\mathrm{Ext}}^i(M,N)$ have been also studied, as well as their relation with the derived functor obtained by using Gorenstein projective resolutions.

In this talk, we continue the ongoing program on Gorenstein homological algebra, and prove that over a local Notherian and Gorenstein ring, the class of Gorenstein projective modules is preenveloping on R-mod, the subcategory of finitely generated modules. So we consider the left derived functor $\mathrm{Ext}^i(M,N)$ of $\mathrm{Hom}(-,-)$ balanced by $(\mathrm{proj},\mathrm{proj})$ on R-mod $\times$ R-mod. And we obtain an exact sequence relating Tate $\mathrm{Ext}(M,N)$ groups and the derived functor $\mathrm{Ext}^i(M,N)$.

References

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