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Auslander Class and C–projective Modules Modulo exact Zero-divisors

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Let R be a commutative noetherian ring. A finitely generated R–module C is called semidualizing if the natural homothety map $\chi^R_C : R \longrightarrow \mathrm{Hom}_R(C, C)$ is an isomorphism and $\mathrm{Ext}^{>0}_R(C, C) = 0$. For example every finite projective R–module of rank 1 is semidualizing. A semidualizing R–module C gives rise to two full subcategories of the category of R–modules, namely the Auslander class $\mathcal{A}_C(R)$ and the Bass class $\mathcal{B}_C(R)$ defined by Avramov and Foxby. An element x of R is called an exact zero–divisor on an R–module M if $xM \neq M$, $xM \neq 0$ and there is $y \in R$ such that the sequence of multiplication maps $M \xrightarrow{x} M \xrightarrow{y} M \xrightarrow{x} M$ is exact.

In this talk, we are going to investigate the effect of an exact zero–divisor on a semidualizing module C and the classes $\mathcal{A}_C(R)$ and $\mathcal{B}_C(R)$.

We also discuss about the class of C–projective modules, $\mathcal{P}_C(R)$, modulo exact zero divisors. We show that if x is an exact zero–divisor on both R and C, then x is an exact zero–divisor on an R–module M whenever $\mathcal{P}_C - \mathrm{pd}(M) < \infty$, which implies that $\mathcal{P}_{C/xC} - \mathrm{pd}(M/xM) \leq \mathcal{P}_C - \mathrm{pd}(M)$. This is a joint work with Mohammad T. Dibaei.