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MATHEMATICS DEPARTMENT 25TH YEAR SEMINARS

Dual Baer Criterion and R-projectivity of injective modules

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Abstract: Let R be a ring with unity and $\text{Mod-}R$ be the category of right R -modules. The Baer's Criterion for injectivity states that a right module M is injective iff it is R -injective, that is for each right ideal I of R , any homomorphism from I into M extends to R . Dually, a right module P is R -projective if for each right ideal I of R any homomorphism from M into R/I lifts to R . Unlike the case for injectivity, R -projective modules need not be projective. That is, the Dual Baer Criterion (DBC, for short) does not hold over every ring. The rings R for which the DBC holds in $\text{Mod-}R$ are called right testing. From [4], it is known that right perfect rings are right testing. In [3], Faith stated the characterization of all right testing rings as an open problem. Recently in [6], Trlifaj proved that, the problem of characterizing right testing rings is undecidable in ZFC.

In this talk, after summarizing the aforementioned results, I will mention an extend of the notion of R -projectivity, and discuss some problems related to the rings whose injective right modules are R -projective which are partially solved in [1].

References

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- [4] F .L. Sandomierski, *Relative injectivity and projectivity*, 1964. Thesis (Ph.D.) The Pennsylvania State University.
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