Quasi-Baer module hulls and examples

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Abstract

The notions of Baer rings have their roots in functional analysis with close links to C^*-algebras and von Neumann algebras. Kaplansky introduced the notion of Baer and Rickart rings in [1]. He and many others obtained a number of interesting results on these two classes of rings which have their roots in Functional Analysis. Also, it has been of interest to investigate finite dimensional algebras over an arbitrary algebraically closed field. Clark [2] initially defined a quasi-Baer ring R (i.e., a ring R for which the left annihilator of every ideal is given by Re with $e^2 = e \in R$) to help characterize a finite dimensional algebra over an algebraically closed field to be a twisted semigroup algebra, which is also a generalization of Baer rings.

In 2004, the concept of (quasi-)Baer rings was extended by Rizvi-Roman to the general module theoretic setting, by considering an R-module M as an S-R bimodule, where $S = \mathrm{End_R(M)}$ as a part of Morita context. A module M is said to be (*quasi-*)*Baer* if the right annihilator in M of any *subset* (*two-sided ideal*) of S is generated by an idempotent in S. A number of interesting papers have been published on these concepts in recent years.

In this talk, we introduce the definition and some results of quasi-Baer module hulls. For a given module M, the smallest quasi-Baer overmodule of M in $E(M)$ is called the *quasi-Baer module hull* of M. Also we proved when a ring R is semiprime and ideal intrinsic over its center, it is shown that every finitely generated projective R-module has a quasi-Baer hull. Let R be a Dedekind domain with F its field of fractions and let $\{K_i | i \in \lambda\}$ be any set of R-submodules of F_R. For an R-module M_R with $\mathrm{Ann_R(M)} \neq 0$, we show that $M_R \oplus (\bigoplus_{i\in\lambda} K_i)_R$ has a quasi-Baer module hull if and only if M_R is semisimple.

Keywords

(quasi-)Baer rings, (quasi-)Baer modules, quasi-Baer module hull

References

[1] I. Kaplansky, *Rings of operators*, W. A. Benjamin, Inc., New York-Amsterdam (1968)

[2] W.E. Clark, Twisted matrix units semigroup algebras, Duke Math. J., **1967** *34*, 417–423