

Title: Modules with a minimal generating set

Author: Michal Hrbek

Department: Department of Algebra

Supervisor: Mgr. Pavel Růžička, Ph.D., Department of Algebra

Abstract: By a minimal generating set of a module we mean a subset which generates the module but any of its proper subsets does not. If the module is not finitely generated, an existence of a minimal generating set is not guaranteed. We say that a module is weakly based if it has a minimal generating set. In the presented thesis, we provide a characterization of weakly based modules over Dedekind domains. As an application of this, we show that the class of weakly based modules is not closed under extensions and the complement of this class is not closed under finite direct sums. Also, we show an example of an abelian group which is weakly based if and only if CH holds. Then we treat rings such that all modules are weakly based. We prove that a Baer regular ring has this property if and only if it is semisimple, and we show that any \aleph_0 -noetherian commutative semiartinian ring has this property. Final part of the text concerns the problem of Nashier and Nichols - does any generating set of any module over a perfect ring contain a minimal generating set?

Keywords: module, minimal generating set, weak basis