NAKAYAMA'S LEMMA FOR ARTINIAN MODULES AND GENERALIZED MATLIS DUALITY

İsmail Hakkı Denizler [1]

[1] *Yüzüncü Yıl Üniversitesi, Van, Turkey*

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Abstract

The purpose of this study is to produce Nakayama's Lemma for Artinian modules. Note that Nakayama's Lemma is applicable for Noetherian modules. To prove the Artinian case, we develop a generalization of Matlis duality which applies to a complete semi-local Noetherian ring; This enables us to pass back and forth between the category of Noetherian modules and Artinian modules. This technique is used in conjunction with the completion of R (the ring we define modules over) related to R-module A, to show how several result about Artinian modules can be deduced from well-known classical Noetherian results. The classical duality of Matlis was originally developed for a complete local Noetherian ring. We use the fact that such a ring is isomorphic to a direct product of finitely many complete local rings and appeal to the standard version of Matlis' duality.

Keywords: Artinian rings and modules, finite dimensional algebras.

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[1]e-mail: ismailhd@yyu.edu.tr