ABSTRACT

ENDOMORPHISM RINGS OF FINITELY GENERATED MODULES OVER A PRINCIPAL IDEAL DOMAIN

By

Johannes Romaldy Stephanus

NIM : 20112032

(Department of Mathematics)

This thesis deals with an identification of endomorphism rings of finitely generated modules over a principal ideal domain with matrix ring. A fact that will be used is that a finitely generated module over a principal ideal domain can be decomposed into a direct sum of its torsion submodule and a free submodule. Furthermore, the torsion submodule can be decomposed into a direct sum of primary submodules and each primary submodules can be decomposed into a direct sum of cyclic submodules. On the other hand, the free submodule can be decomposed into a direct sum of cyclic submodules generated by elements in its basis. In this thesis, it is shown that the endomorphism rings of finitely generated modules over a principal ideal domain can be identified by a 2x2 upper block matrix ring where block-(11) represents the endomorphism ring of torsion submodule, block-(12) represents the homomorphism module from the free submodule to the torsion submodule, and block-(22) represents the endomorphism ring of free submodule. Details of each block is also presented in this thesis.

Keyword: principal ideal domain, module over a principal ideal domain, finitely generated, endomorphism ring.