

Homework 2

1. Let M be a module with finite composition length and let $f \in \text{End}(M)$. Prove that there exists a positive integer n such that $M = \text{Ker}(f^n) \oplus \text{Im}(f^n)$.
2. Prove that the following are equivalent for a module M ;
 - (a) Every ascending chain of submodules of M terminates.
 - (b) Every submodule of M is finitely generated.
3. Give example of an artinian module which is not noetherian.