1074-94-222　　　　　**Xiaoyu Liu*** (`xiaoyu.liu@wright.edu`), 3640 Colonel Glenn Highway, Dayton, OH 45435. *The Extension Theorem on Additive Codes over Finite Abelian Groups.*

The extension theorem of MacWilliams deals with the notion of equivalence of linear codes. It claims that if two linear codes over a finite Frobenius ring are isomorphic as abstract vector spaces via an isomorphism which preserves Hamming weight, then this isomorphism extends to a monomial transformation. In this paper, we study the extension theorem on additive codes over finite abelian groups. For an additive code over a finite abelian group, any coordinate of the code can be re-scaled by applying an automorphism on the group that preserves the weight defined on that group. Two additive codes are equivalent with respect to a certain weight if one can be obtained from the other by re-arranging and/or re-scaling its coordinates with respect to the weight. A weight is called extensible on some group if any weight preserving injective homomorphism extends to an automorphism on the group that still preserves the weight. Our main result of the paper proves that a weight defined on any finite abelian group admits the extension theorem if and only if it is extensible. We then study extensible weights on some certain finite abelian groups, and finite abelian groups on which a certain type of weight is always extensible. (Received August 22, 2011)