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Finitary Actions and Invariant Ideals

D. S. PASSMAN
Department of Mathematics
University of Wisconsin
Madison, Wisconsin 53706, USA
e-mail: passman@math.wisc.edu

Keywords
Authors

Abstract: Let K be a field and let G be a group. If G acts on an abelian group V, then it acts naturally on any group algebra K[V], and we are concerned with classifying the G-stable ideals of K[V]. In this paper, we consider a rather concrete situation. We take G to be an infinite locally finite simple group acting in a finitary manner on V. When G is a finitary version of a classical linear group, then we show that the augmentation ideal ω K[G] is the unique proper G-stable ideal of K[V]. On the other hand, if G is a finitary alternating group acting on a suitable permutation module V, then there is a rich family of G-stable ideals of K[V], and we show that these behave like certain graded ideals in a polynomial ring.

Key Words: group algebra, invariant ideal, locally finite simple group, finitary permutation group, permutation module, finitary linear group

math@tubitak.gov.tr

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