

ON MODULAR REPRESENTATION ALGEBRAS
OF CYCLIC p -GROUPS

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Let G be a cyclic group of order p^m for prime p and K a field of characteristic p . There exist exactly p^m distinct isomorphism classes of indecomposable (K, G) -modules: choose representatives from these classes as basis elements over the complex field for the algebra $A_{p,m}$ and over K for the algebra $A_{p,m}^*$, with products defined by tensor products of modules and direct sum decomposition.

These algebras may be regarded as restricted polynomial algebras over their underlying field. By examining roots of various polynomials related to those of Chebyshev, algorithms for the characters of these algebras are derived.

This is used to show that $A_{2,m}^*$ is a local ring (a result due to Carlson, 1979) and that for $p > 2$, $A_{p,m}^*$ is a direct sum of 2^m local rings. The idempotent and dimension of each summand are determined.

The algebra $A_{p,1}$ is shown to be isomorphic to a matrix algebra M_p , and the class of algebras M_n is examined, for n not necessarily prime.

Recurrence relations for the exterior powers $\Lambda^r(V_n)$ in $A_{p,1}$ are also

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derived.

Extracts from this thesis may be found in Renaud [1], [2] and [3].

References

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