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THE STRUCTURE OF THE UNIT GROUP OF A GROUP ALGEBRA OF A GROUP OF ORDER 37

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Abstract: Let FG be the group algebra of a group G over a finite field F of characteristic $p > 0$ with $q = p^n$ elements. In this paper, a complete characterization of the unit group $U(FC_{37})$ of the group algebra FC_{37} for the group C_{37} of order 37, over a finite field of characteristic $p > 0$ has been obtained.

Keywords and Phrases: Group algebras, Unit groups, Jacobson radical.

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1. Introduction

Let FG be the group algebra of a group G over a field F, for a given normal subgroup H of G, we can extend any group homomorphism G to G/H, to an F-algebra homomorphism from FG onto $F[G/H]$. The homomorphism is defined as:

$$\sum_{g\in G} a_g g \mapsto \sum_{g\in G} a_g gH, \text{ for } a_g \in F.$$

It can be written as $\frac{FG}{\omega(H)} \cong F[\frac{F}{H}]$, where $\omega(H)$ is the kernal of $F-$algebra homomorphism. Also,

$$\omega(H) = \omega(FH)FG = FG\omega(FH),$$