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Commutative modular group algebras of p -mixed and p -splitting abelian Σ -groups

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Abstract: Let G be a p -mixed abelian group and R is a commutative perfect integral domain of $\text{char}R = p > 0$. Then, the first main result is that the group of all normalized invertible elements $V(RG)$ is a Σ -group if and only if G is a Σ -group. In particular, the second central result is that if G is a Σ -group, the R -algebras isomorphism $RA \cong RG$ between the group algebras RA and RG for an arbitrary but fixed group A implies A is a p -mixed abelian Σ -group and even more that the high subgroups of A and G are isomorphic, namely, $\mathcal{H}_A \cong \mathcal{H}_G$. Besides, when G is p -splitting and R is an algebraically closed field of $\text{char}R = p \neq 0$, $V(RG)$ is a Σ -group if and only if G_p and G/G_t are both Σ -groups. These statements combined with our recent results published in Math. J. Okayama Univ. (1998) almost exhausted the investigations on this theme concerning the description of the group structure.

Keywords: group algebras, high subgroups, p -mixed and p -splitting groups, Σ -groups

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