

The Isomorphism Problem for Rational Group Algebras of Metacyclic Groups

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Abstract

The Isomorphism Problem for group rings with coefficients in a ring R asks whether the isomorphism type of a group G is determined by its group ring RG . In general, it has a negative solution if no assumption is made about the ring or the group. For example, for abelian groups it has a positive solution if R is the field \mathbb{Q} of rational numbers, but it has a negative solution in case R is the field of complex numbers. For metabelian groups it has a negative solution for every field, but a positive solution for $R = \mathbb{Z}$, the ring of integers. With the aim to understand which property in between abelian and metabelian suffices for a positive solution in the case $R = \mathbb{Q}$, we discuss the Isomorphism Problem for rational group rings of metacyclic groups. We prove a positive result under the assumption that G is nilpotent.

Keywords

Group Rings, Metacyclic Groups, Group Theory, Ring Theory.