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Decomposition of Automorphism

The purpose of this research was to develop a method for constructing and deconstructing abstract groups based on their direct and semi-direct product decompositions. Although methods exist for certain instances in which the normal subgroup of the semi-direct product decomposition is abelian, the goal of this research was to broaden the scope of such methods as applied to specific groups such as the dihedral and symmetric groups as well as groups in general. One of the main focuses of this research was on the automorphism groups of the abelian group in semi-direct product decomposition and how they acted in relation to “quasi-abelian groups,” or groups created by the semi-direct product of a cyclic group and a group generated by a single automorphism. By utilizing “structure preserving action,” the automorphism group of any group, X , was explored in the context of creating examples of automorphisms and the groups to which they correspond. Finally, the internal and external definitions of a semi-direct product were applied in order to develop a foundation for the decomposition of automorphism groups into their semi-direct product decompositions.