Nonlinear Sciences > Exactly Solvable and Integrable Systems

On the Classification of Automorphic Lie Algebras

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It is shown that the problem of reduction can be formulated in a uniform way using the theory of invariants. This provides a powerful tool of analysis and it opens the road to new applications of these algebras, beyond the context of integrable systems. Moreover, it is proven that sl2-Automorphic Lie Algebras associated to the icosahedral group I, the octahedral group O, the tetrahedral group T, and the dihedral group Dn are isomorphic. The proof is based on techniques from classical invariant theory and makes use of Clebsch-Gordan decomposition and transvectants, Molien functions and the trace-form. This result provides a complete classification of sl2-Automorphic Lie Algebras associated to finite groups when the group representations are chosen to be the same and it is a crucial step towards the complete classification of Automorphic Lie Algebras.

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