Some Properties of Fuzzy Sets on Finite Type of Kac-Moody Algebra G2

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Abstract

The Kac-Moody algebras have been attracting the attention of a lot of Mathematicians because of its various connections and applications to different branches of Mathematics and Mathematical Physics since the introduction of the subject in 1968, developed simultaneously and independently by Kac and Moody. On the other hand, Fuzzy sets first originated in a seminar paper by Lotfi A. Zadeh in 1965. The theory on fuzzy sets has been applied not only to all branches of Mathematics but also acts as a tool for solving challenging problems in science & technology and social problems. Fuzzy approach on Kac-Moody algebras was initiated by A. Uma Maheswari [4] in which fuzzy sets were defined on the root system of Kac-Moody algebras. Some fuzzy properties were studied for the finite type of Kac-Moody algebras A1, B1, C1, D1, E6, E7, E8, in [4], [7] & [9], for the affine type of Kac-Moody algebras in [5] & [6] and hyperbolic type HG2 in [8]. In this paper another fuzzy approach is attempted on the root system of finite type of Kac-Moody algebra G2. Fuzzy sets are defined on the cartesian product of the root basis of G2 using an invariant, non degenerate, symmetric bilinear form. Some of the basic properties like support, core, normality, height, cardinality, relative cardinality, complement and convexity are studied; ? – level sets and strong ? – level sets are computed. ? – cut decomposition, hamming distance and euclidean distance for the fuzzy set associated with G2 of finite type of Kac-Moody algebra are also computed.
References


Index Terms

Computer Science             Fuzzy Systems

Keywords

Generalized Cartan Matrix  Kac-Moody algebra  root basis  non-degenerate form fuzzy set

core

normal
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height
convexity
\( \mu \)-level set
strong \( \mu \)-level set
\( \mu \) – cut decomposition