

Ternary Numbers and Algebras Reflexive Numbers and Berger Graphs

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Abstract. The Calabi-Yau spaces with $SU(n)$ holonomy can be studied by the algebraic way through the integer lattice where one can construct the Newton reflexive polyhedra or the Berger graphs. Our conjecture is that the Berger graphs can be directly related with the n -ary algebras. To find such algebras we study the n -ary generalization of the well-known binary norm division algebras, \mathbb{R} , \mathbb{C} , \mathbb{H} , \mathbb{O} , which helped to discover the most important “minimal” binary simple Lie groups, $U(1)$, $SU(2)$ and $G(2)$. As the most important example, we consider the case $n = 3$, which gives the ternary generalization of quaternions (octonions), 3^n , $n = 2, 3$, respectively. The ternary generalization of quaternions is directly related to the new ternary algebra (group) which are related to the natural extensions of the binary $su(3)$ algebra ($SU(3)$ group). Using this ternary algebra we found the solution for the Berger graph: a tetrahedron.

“Why genius live so short?
They wanna stay kids.”

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