

# GRADED IDENTITIES FOR KAC-MOODY AND HEISENBERG ALGEBRAS WITH THE CARTAN GRADING

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ABSTRACT. The Kac–Moody algebras,  $\mathfrak{g}(A)$ , are Lie algebras defined by generators and relations given by generalized Cartan matrices  $A$ . In this talk, we present the graded identities for Kac-Moody algebras when the matrix  $A$  is diagonal. More precisely, we provide a basis for the graded identities of  $\mathfrak{g}(A)$  equipped with its natural grading, the grading of Cartan type. These results are obtained over an arbitrary infinite field. We also compute the graded codimensions for these algebras and provide a basis for the vector space of the multihomogeneous polynomials of any given multidegree in the relatively free algebra. As the base field is infinite we have a vector space basis of the relatively free algebra. As consequence we give an alternative proof of Theorem 17 in [3], and generalize it to characteristic two. Finally, we also describe a basis of the graded identities for the Heisenberg algebra with its natural grading, over any field.

## REFERENCES

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UFERSA

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