talk

ON MATRIX REPRESENTATIONS OF GEOMETRIC (CLIFFORD) ALGEBRAS

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The representations of geometric (Clifford) algebras with square real matrices [1, 2] are reviewed in order to see whether some advantage can be gained when considering them from an arithmetic point of view [3], meaning without resorting to algebraic structure. Many isometries such as rotations [4, 5, 6] and Lorentz transformations [7] are written as similarity transformations of matrices, which will be chosen as the general definition of isometry. Then, it will be deduced in which geometric algebras all the known isometries as well as the transformations that could be considered isometries can be written as similarity transformations. Since similar matrices have the same characteristic polynomial [8], the norm of every element of a geometric algebra should be defined from some combination of its coefficients. It is proposed to define the norm of every element of a geometric algebra as the n^{th}-root of the absolute value of the determinant of its matrix representation with dimension $n \times n$, which is the independent term of the characteristic polynomial. Some examples of the usefulness of this definition will be provided in order to confirm its consistency and generality.

REFERENCES

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