talk 1

PROJECTIVE, CLIFFORD AND GRASSMANN ALGEBRAS AS DOUBLE AND COMPLEMENTARY GRADED ALGEBRAS

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In this talk we will establish the concept of projective algebra Λ_n and of Clifford double algebra Γ_n and compare both (a) to what is usually known as Grassmann algebra and (b) to Grassmann algebra in the approach of John Brown. [1]

The 2^n-dimensional projective algebra $\Lambda_n(+,\cdot,\wedge,\vee)$ and the 2^n-dimensional Clifford double algebra $\Gamma_n(+,\cdot,\ ,*)$ both carry the imprint of an algebra twice, i. e. they have a dual axiomatic structure. Projective algebra is the more fundamental concept than Clifford double algebra, since any Clifford double algebra also shows the structure of projective algebra whereas projective algebra is standing on its own.

John Browne used the term *Grassmann algebra* in [1] to describe the body of algebraic theory and results based on Graßmann's *Ausdehnungslehre* from 1844 and from 1862. This Grassmann algebra shows a dual axiomatic structure as projective algebra and Clifford double algebra do. We will compare Grassmann algebra in the approach of John Browne with the complementary graded projective algebra Λ_n and the Clifford double algebra Γ_n.

REFERENCES

[1] J. Browne, Grassmann Algebra. Volume 1: Foundations. Exploring extended vector algebra with *Mathematica*. Barnard Publishing, Eltham, Australia, 2012, ISBN 978-1479197637.