

HOMOTOPY METHODS IN ABSOLUTE VALUED STRUCTURES

A. J. CALDERON MARTIN

An algebra A is called absolute valued if it is endowed with a space norm $\|\cdot\|$ such that $\|xy\| = \|x\|\|y\|$ for all $x, y \in A$. Since 1918, there was a series of results on absolute valued algebras culminating in Albert's paper [1] asserting that any finite-dimensional absolute valued real algebra is of dimension $n = 1, 2, 4$ or 8 and isotopic to one of the classical absolute valued algebras $\mathbb{R}, \mathbb{C}, \mathbb{H}$ or \mathbb{O} . Since then, the study of absolute valued algebras has undergone an important development with a number of contributions. The absolute valued structures theory also involves the absolute valued two-graded algebras and the absolute valued triple systems, [2, 3]. The notion of homotopy of absolute valued algebras appears in [4]. Roughly speaking two absolute valued algebras are said to be homotopic if the product of the first algebra can be continuously deformed through absolute valued products into the product of the second one. In the present work we extend the notion of homotopy to the frameworks of absolute valued two-graded algebras and absolute valued triple systems, and show how this concept let us obtain some invariants in any kind of absolute valued structure in such a way that we can give, in a sense, a unifying viewpoint of the theory.

REFERENCES

- [1] A. A. Albert, *Absolute valued real algebras*, Ann. of Math. **48** (1947), 495-501.
- [2] A. J. Calderón and C. Martín, *Absolute-valued triple systems*, Intern. Math. J. **32** (6) (2004), 2443-2455.
- [3] A. J. Calderón and C. Martín, *Two-graded absolute-valued algebras*, J. Algebra **292** (2005), 492-515.
- [4] A. J. Calderón, A. Kaidi, A. Morales, C. Martín, M. Ramirez and A. Rochdi *Finite dimensional absolute-valued algebras* Preprint. University of Cadiz.

DEPARTAMENTO DE MATEMATICAS, UNIVERSIDAD DE CADIZ, 11510, PUERTO REAL, CADIZ, SPAIN

E-mail address: `ajesus.calderon@uca.es`