

# How many units may an $A$ -infinity algebra have?

Fernando Muro

$A$ -infinity algebras are homotopical counterparts of associative algebras. They arose in Stasheff's 1961 thesis [1] in the topological and in the differential graded categories. Since then,  $A$ -infinity algebras have permeated many fields of mathematics and physics.

We all know that an associative algebra may have at most one unit. What about  $A$ -infinity algebras? In a homotopical context we are not interested in counting units. We will rather define a sensible space of units for an  $A$ -infinity algebra and show that it is always contractible for a wide range of base model categories, including chain complexes, groupoids, and spaces. For this, we will make extensive use of the homotopy theory of non-symmetric operads.

## REFERENCES

- [1] Stasheff, James Dillon *Homotopy associativity of H-spaces. I, II.* Trans. Amer. Math. Soc. 108 (1963), 275-292; *ibid.* 108 1963 293312.