ZONOIDS: WHAT ARE THEY AND HOW TO MULTIPLY THEM

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Zonoids are a particular class of convex bodies, they are defined as limits of finite Minkowski sum of line segments. I will explain the different terms of this definition (limit, Minkowski sum...). I will show that zonoids are easily constructed using random vectors following a method introduced by Vitale. I will then present what I like to call the Fundamental Theorem of Zonoid Calculus, joint work with P.Burgisser, P.Brieding & A. Lerario [1], which allows to build multilinear operations on the space of zonoids. In particular this allows to define a product on the space of zonoids of the exterior algebra and hence define the *zonoid algebra*, see Figure 1. I will show how this algebra computes random intersections in stochastic geometry, this is a work in progress with P.Burgisser, P.Brieding & A. Lerario and with M. Stecconi.

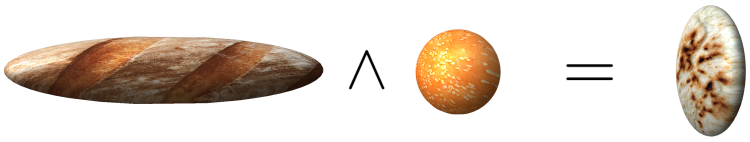

FIGURE 1. The wedge product of zonoids illustrated with bread

REFERENCES

[1] P. Breiding, P. Bürgisser, A. Lerario, and L. Mathis. The zonoid algebra, generalized mixed volumes, and random determinants. *Advances in Mathematics*, 402:108361, 2022.

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