

## **A first approach to Hadamard product of varieties**

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The definition of Hadamard product  $X*Y$  of two projective varieties,  $X, Y$  in  $P^n$  is given in two papers of Algebraic Statistics, but, in literature, there is not any paper regarding its geometric properties. Thus, our paper wants to be a first pioneering approach to the study of varieties arising from the Hadamard product.

After some preliminary results, we fix our attention in the case of the Hadamard powers (i.e. the Hadamard product of a variety with itself)  $L^{*r} := L*...*L$  of a line  $L$ . We prove that, under some condition,  $L^{*r}$  is a linear space of dimension  $r$  and we compute its Pluecker coordinates. Successively, given a finite set of points  $Z$  in  $P^n$ , we define the square free Hadamard  $r$ -th power of  $Z$ , denoted  $Z^{*r}_0$ , and we prove that if  $Z$  is contained in a line, then  $Z^{*r}_0$  is a star configuration in  $P^r$ .

This talk is based upon joint work with Enrico Carlini and Joe Kileel.