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*Determining the Waring rank: special cases*

The Waring rank of an homogeneous degree  $d$  polynomial  $F(x_1, \dots, x_n)$  is the minimal  $s$  such that we can write

$$F = L_1^d + \dots + L_s^d,$$

where the  $L_i$  are linear forms. As a matter of fact, there is no effective algorithm to compute the Waring rank,  $\text{rk}(F)$ , of a given polynomial. Thus we will show the few cases in which  $\text{rk}(F)$  is explicitly known. Namely, if  $F$  is a degree two form (classically known) or if  $F$  is a monomial or a sum of coprime monomials. This is based on joint work with M.V.Catalisano and A.V.Geramita.