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On the representation of general forms

I will illustrate some recent results on the representation of polynomials by means of determinants and pfaffians of matrices of forms, with fixed degrees. One can always represent a general ternary form as a determinant or a pfaffian, whatever the prescribed degrees are, but this property fails for forms of high degree in more variables. Hence, I will consider the minimal number of determinants or pfaffians needed to represent forms with more than three variables. This problem, of clear algebraic flavor, can be studied with methods of Algebraic geometry (secant varieties), and it turns out to have some intersection with applications in control theory.