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A Waring problem with higher degree terms

The aim of this talk is to present a variant of the traditional Waring problem for polynomials. We define the k^{th}-Waring rank of a form of degree kd to be the length of its minimal additive decomposition as sum of k^{th}-powers of forms of degree d. After the presentation of the main result due to Fröberg, Ottaviani and Shapiro who gave an upper bound (asymptotically sharp for large d) for the k^{th}-Waring rank of a generic form, we will see other recent results in the case of sum of squares and monomials. This is a joint work with Enrico Carlini.