On Hilbert identities and designs on the simplex

Masanori Sawa (Nagoya University)

Abstract

A Hilbert identity is a representation of $(x_1^2 + \cdots + x_n^2)^r$ as a sum of $2r$-th powers of real linear forms $\alpha_1 x_1 + \cdots + \alpha_n x_n$, which originally stems from Hilbert's solution of Waring's Problem in number theory. There is a beautiful connection with cubature formulas on spheres. In this talk I will introduce this connection and related facts, and show a new relation between spherical cubature and "simplical" cubature. I will discuss what we know when translating spherical cubature into identities, or conversely, translating identities with cubature terminology. You can also enjoy many collaborators who appear in my talk!