# Parseval-Rayleigh Identities and volumes

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One key tool to understand rigidity and higher rigidity of simplicial spheres, and Gorenstein rings more generally, is to study the volume map, that is, the parametrization of the unique top-dimensional linear stress, in terms of the location of the vertices. Describing this explicitly, in terms of differential identities, turned out to be the key of the simpler proof of the g-conjecture in characteristic two. However, in subsequent work on lattice polytopes, we discovered that these differential identities themselves are a special case of a single polynomial identity that resembles Parseval-Rayleigh identities from Fourier analysis and is simultaneously related to Frobenius twists and residue theory.

I will present this identity, which we first proved for lattice complexes and have since extended to other classes of objects. This includes past and ongoing joint work with K. Adiprasito, E. Katz, R. Oba, and S. Papadakis.