
Discrete Fourier Analysis and Cubature on the Fundamental Tetrahedra of 3-Dimensional Root Lattices

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A discrete Fourier analysis associated with root lattices has been developed recently. It permits two lattices, one determining the integral domain and the family of exponential functions, the other determining the quadrature points and the truncation of Fourier series. In the talk, possible choices of the 3-dimensional root lattices are discussed; and several families of trigonometric functions, which serve as the Laplacian eigenfunctions on the fundamental tetrahedra, is then obtained. Besides, some new results on cubature and interpolation by trigonometric, as well as algebraic, polynomials are derived.